

**D-1**

**ARIZONA STATE BOARD OF DENTAL EXAMINERS**

Title 4, Chapter 11

**Amend:** R4-11-101, R4-11-201, R4-11-202, R4-11-203, R4-11-301, R4-11-303,  
R4-11-401, R4-11-403, R4-11-701, R4-11-702, R4-11-1502, R4-11-1503

**New Section:** R4-11-206, R4-11-1210, R4-11-1601, R4-11-1602, R4-11-1603, R4-11-1604

**New Article:** Article 16



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - REGULAR RULEMAKING

---

**MEETING DATE:** April 25, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 11, 2023

**SUBJECT:** ARIZONA STATE BOARD OF DENTAL EXAMINERS  
Title 4, Chapter 11

**Amend:** R4-11-101, R4-11-201, R4-11-202, R4-11-203, R4-11-301, R4-11-303,  
R4-11-401, R4-11-403, R4-11-701, R4-11-702, R4-11-1502, R4-11-1503

**New Section:** R4-11-206, R4-11-1210, R4-11-1601, R4-11-1602, R4-11-1603, R4-11-1604

**New Article:** Article 16

---

### **Summary:**

*This regular rulemaking from the Arizona State Board of Dental Examiners (Board) was previously considered at the March 28, 2023 Study Session and tabled at the April 4, 2023 Council Meeting due to the Notice of Final Rulemaking (NFR) not addressing the comments received by the Oral Health Coalition. Since that time, the Board has updated their NFR to include the complete record as required under ARS § 41-1052 (D)(6) and this information has been submitted to the Council. This regular rulemaking with the Arizona State Board of Dental Examiners (Board) seeks to amend twelve (12) rules, add one (1) article, and add six (6) new sections to ensure that dental professionals are properly licensed and regulated by (1) amending requirements for continuing education related to tobacco cessation and chemical dependency, (2) ensuring that course credentials are sent directly to the Board from the issuing institution and (3) clarifying that notices of complaints may be sent via email. The Board is also conducting the rulemaking to account for the newly created mid-level dental profession, Dental Therapists, which can be found in Arizona Revised Statutes §§ 32-1276 – 32-1276.05.*

1. **Are the rules legal, consistent with legislative intent, and within the agency's statutory authority?**

The Board cites both general and specific statutory authority for these rules.

2. **Do the rules establish a new fee or contain a fee increase?**

The Board indicates that the rules do not establish a new fee or contain a fee increase.

3. **Does the preamble disclose a reference to any study relevant to the rules that the agency reviewed and either did or did not rely upon?**

The Board indicates it did not review or rely on any study in conducting this rulemaking.

4. **Summary of the agency's economic impact analysis:**

According to the Board, there is little to no economic, small business, or consumer impact, other than the cost to the Board to prepare the rule package, because the rulemaking simply clarifies statutory requirements that already exist.

5. **Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Board believes that by amending its rules this will be a benefit to the dental community and the public they serve with minimal costs.

6. **What are the economic impacts on stakeholders?**

Applicants for a dental therapist license will obtain the costs of the required education and license to practice in the State of Arizona. The benefit of the new license increase access for rural areas of the state, which includes tribal communities. Additionally, this allows tribal communities to attract dental providers in their area and retain licensees.

7. **Are the final rules a substantial change, considered as a whole, from the proposed rules and any supplemental proposals?**

The Board indicates that the final rules are not a substantial change, considered as a whole, from the proposed rules and any supplemental proposals.

8. **Does the agency adequately address the comments on the proposed rules and any supplemental proposals?**

The Board indicates that it received one comment from the Inter Tribal Association of Arizona dated July 25, 2022, requesting the Board adopt language clarifying that dental therapy services may be provided on tribal lands. After consulting with the Board's Assistant Attorney

General, the Board determined that such language was already addressed in federal law and it is not necessary or appropriate to address that language in these rules. Council staff believes the Department has adequately responded to the comments on these proposed rules.

**9. Do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Board indicates that the rules require a general permit pursuant to ARS § 41-1037.

**10. Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Board indicates that this subsection does not apply as there is no federal law applicable to this rule.

**11. Conclusion**

This regular rulemaking with the Arizona State Board of Dental Examiners seeks to amend twelve (12) rules, add one (1) article, and add six (6) new sections to ensure that dental professionals are properly licensed and regulated and to account for the newly created mid-level dental profession, Dental Therapists.

The Department is seeking the standard 60-day delayed effective date pursuant to A.R.S. § 41-1032(A). Council staff recommends approval of this rulemaking.



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - REGULAR RULEMAKING

---

**MEETING DATE:** April 4, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** March 3, 2023

**SUBJECT:** ARIZONA STATE BOARD OF DENTAL EXAMINERS  
Title 4, Chapter 11

**Amend:** R4-11-101, R4-11-201, R4-11-202, R4-11-203, R4-11-301, R4-11-303,  
R4-11-401, R4-11-403, R4-11-701, R4-11-702, R4-11-1502, R4-11-1503

**New Section:** R4-11-206, R4-11-1210, R4-11-1601, R4-11-1602, R4-11-1603, R4-11-1603

**New Article:** Article 16

---

### **Summary:**

This regular rulemaking with the Arizona State Board of Dental Examiners (Board) seeks to amend twelve (12) rules, add one (1) article, and add six (6) new sections to ensure that dental professionals are properly licensed and regulated by (1) amending requirements for continuing education related to tobacco cessation and chemical dependency, (2) ensuring that course credentials are sent directly to the Board from the issuing institution and (3) clarifying that notices of complaints may be sent via email. The Board is also conducting the rulemaking to account for the newly created mid-level dental profession, Dental Therapists, which can be found in Arizona Revised Statutes §§ 32-1276 – 32-1276.05.

1. **Are the rules legal, consistent with legislative intent, and within the agency's statutory authority?**

The Board cites both general and specific statutory authority for these rules.

**2. Do the rules establish a new fee or contain a fee increase?**

The Board indicates that the rules do not establish a new fee or contain a fee increase.

**3. Does the preamble disclose a reference to any study relevant to the rules that the agency reviewed and either did or did not rely upon?**

The Board indicates it did not review or rely on any study in conducting this rulemaking.

**4. Summary of the agency's economic impact analysis:**

According to the Board, there is little to no economic, small business, or consumer impact, other than the cost to the Board to prepare the rule package, because the rulemaking simply clarifies statutory requirements that already exist.

**5. Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Board believes that by amending its rules this will be a benefit to the dental community and the public they serve with minimal costs.

**6. What are the economic impacts on stakeholders?**

Applicants for a dental therapist license will obtain the costs of the required education and license to practice in the State of Arizona. The benefit of the new license increase access for rural areas of the state, which includes tribal communities. Additionally, this allows tribal communities to attract dental providers in their area and retain licensees.

**7. Are the final rules a substantial change, considered as a whole, from the proposed rules and any supplemental proposals?**

The Board indicates that the final rules are not a substantial change, considered as a whole, from the proposed rules and any supplemental proposals.

**8. Does the agency adequately address the comments on the proposed rules and any supplemental proposals?**

The Board indicates that it received one comment from the Inter Tribal Association of Arizona dated July 25, 2022, requesting the Board adopt language clarifying that dental therapy services may be provided on tribal lands. After consulting with the Board's Assistant Attorney General, the Board determined that such language was already addressed in federal law and it is not necessary or appropriate to address that language in these rules. Council staff believes the Department has adequately responded to the comments on these proposed rules.

9. **Do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Board indicates that the rules require a general permit pursuant to ARS § 41-1037.

10. **Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Board indicates that this subsection does not apply as there is no federal law applicable to this rule.

11. **Conclusion**

This regular rulemaking with the Arizona State Board of Dental Examiners (Board) seeks to amend twelve (12) rules, add one (1) article, and add six (6) new sections to ensure that dental professionals are properly licensed and regulated and to account for the newly created mid-level dental profession, Dental Therapists.

The Department is seeking the standard 60-day delayed effective date pursuant to A.R.S. § 41-1032(A). Council staff recommends approval of this rulemaking.



# Arizona State Board of Dental Examiners

“Caring for the Public’s Dental  
Health and Professional Standards”

1740 West Adams Street, Suite 2470

Phoenix, Arizona 85007

P: (602)242-1492

E: [info@dentalboard.az.gov](mailto:info@dentalboard.az.gov)

W: <https://dentalboard.az.gov>

February 10, 2023

Ms. Nicole Sornsins, Chair  
The Governor's Regulatory Review Council  
100 North 15th Avenue, Ste. 402  
Phoenix, AZ 85007

## **Re: A.A.C. Title 4. Professions and Occupations Chapter 11. State Board of Dental Examiners**

Dear Ms. Sornsins:

The attached final rule package is submitted for review and approval by the Governor’s Regulatory Review Council (“Council”). The following information is provided for Council's use in reviewing the rule package:

1. Close of record date: The rulemaking record was closed on December 2, 2022 following a period for public comment and an oral proceeding.
2. Relation of the rulemaking to a five-year-review report: This rulemaking does not relate to a Five-year Review Report.
3. New fee or fee increase: This rulemaking does not establish a new fee or increase an existing fee.
4. Immediate effective date: An immediate effective date is not requested.
5. Certification regarding studies: I certify that the Board did not rely on any studies for this rulemaking.
6. Certification that the preparer of the EIS notified the JLBC of the number of new full-time employees necessary to implement and enforce the rule: I certify that the rules in this rulemaking will not require a state agency to employ a new full-time employee. No notification was provided to JLBC.
7. List of documents enclosed:
  - a. Cover letter signed by the Board's Executive Director;
  - b. Notice of Final Rulemaking including the preamble, table of contents for the rulemaking, and rule text; and
  - c. Economic, Small Business, and Consumer Impact Statement.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ryan P. Edmonson".

Ryan P. Edmonson  
Executive Director



**NOTICE OF FINAL RULEMAKING**  
**TITLE 4. PROFESSIONS AND OCCUPATIONS**  
**CHAPTER 11. STATE BOARD OF DENTAL EXAMINERS**

**PREAMBLE**

**1. Articles, Parts, and Sections Affected**

**Rulemaking Action**

R4-11-101	Amend
R4-11-201	Amend
R4-11-202	Amend
R4-11-203	Amend
R4-11-206	New Section
R4-11-301	Amend
R4-11-303	Amend
R4-11-401	Amend
R4-11-403	Amend
R4-11-701	Amend
R4-11-702	Amend
R4-11-1210	New Section
R4-11-1502	Amend
R4-11-1503	Amend
Article 16	New Article
R4-11-1601	New Section
R4-11-1602	New Section
R4-11-1603	New Section
R4-11-1604	New Section

**2. Citations to the agency's statutory rulemaking authority to include both the authorizing statute (general) and the implementing statute (specific):**

Authorizing statute: A.R.S. § 32-1207

Implementing statutes: A.R.S. §§ 32-1201 et seq.

**3. The effective date for the rules:**

As specified under A.R.S. § 41-1032(A), the rule will be effective 60 days after the rule package is filed with the Office of the Secretary of State.

**a. If the agency selected a date earlier than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the earlier date and state the reason or reasons the agency selected the earlier effective date as provided in A.R.S. § 41-1032(A)(1) through (5):**

Not applicable.

**b. If the agency selected a date later than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the later date and state the reason or reasons the agency selected the later effective date as provided in A.R.S. § 41-1032(B):**

Not applicable.

**4. Citations to all related notices published in the Register as specified in R1-1-409(A) that pertain to the record of the final rulemaking package:**

Notice of Rulemaking Docket Opening: 28 A.A.R. 1230, June 3, 2022

Notice of Proposed Rulemaking: 28 A.A.R. 1173, June 3, 2022

Notice of Supplemental Proposed Rulemaking: 28 A.A.R. 2631, October 7, 2022

**5. The agency's contact person who can answer questions about the rulemaking:**

Name: Ryan Edmonson, Executive Director  
Address: Arizona State Board of Dental Examiners  
1740 W. Adams St., Ste. 2470  
Phoenix, AZ 85007  
Telephone: (602) 542-4493  
E-Mail: [ryan.edmonson@dentalboard.az.gov](mailto:ryan.edmonson@dentalboard.az.gov)

**6. An agency's justification and reason why a rule should be made, amended, repealed, or renumbered, to include an explanation about the rulemaking:**

The Board needs to amend its rules to address Dental Therapists and make other necessary changes to ensure the rules are clear, concise, and consistent.

**7. A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

No study was reviewed.

**8. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable.

**9. A summary of the economic, small business, and consumer impact:**

There is little to no economic, small business, or consumer impact, other than the cost to the Board to prepare the rule package, because the rulemaking simply clarifies statutory requirements that already exist. Thus, the economic impact is minimized.

**10. A description of any changes between the proposed rulemaking, including supplemental notices, and the final rulemaking:**

There were no changes between the supplemental proposed rulemaking and the final rulemaking.

**11. An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments:**

The Board received a letter from the Inter Tribal Association of Arizona dated July 25, 2022, requesting the Board adopt language clarifying that dental therapy services may be provided on tribal lands. However, in consultation with the Board's Assistant Attorney General, the Board determined that such language was already addressed in federal law and it is not necessary or appropriate to address that language in these rules.

**12. All agencies shall list any other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:**

None.

**a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:**

The Board issues general permits to licensees who meet the criteria established in statute and rule.

**b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:**

Not applicable.

**c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:**

No analysis was submitted.

**13. A list of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rule:**

No materials are incorporated by reference.

**14. Whether the rule was previously made, amended, or repealed as an emergency rule. If so, cite the notice published in the Register as specified in R1-1-409(A). Also, the**

**agency shall state where the text was changed between the emergency and the final rulemaking packages:**

Not applicable.

**15. The full text of the rules follows:**

**TITLE 4. PROFESSIONS AND OCCUPATIONS**  
**CHAPTER 11. BOARD OF DENTAL EXAMINERS**  
**ARTICLE 1. DEFINITIONS**

Section

R4-11-101. Definitions

**ARTICLE 2. LICENSURE BY CREDENTIAL**

R4-11-201. Clinical Examination; Requirements

R4-11-202. Dental Licensure by Credential; Application

R4-11-203. Dental Hygienist Licensure by Credential; Application

R4-11-206. ~~Repealed~~ Dental Therapist Licensure by Credential; Application

**ARTICLE 3. EXAMINATIONS, LICENSING QUALIFICATIONS, APPLICATION AND RENEWAL, TIME-FRAMES**

R4-11-301. Application

R4-11-303. Application Processing Procedures: Issuance, Denial, and Renewal of Dental Licenses, Dental Therapy Licenses, Restricted Permits, Dental Hygiene Licenses, Dental Consultant Licenses, Denturist Certificates, Drug or Device Dispensing Registrations, Business Entity Registration and Mobile Dental Facility and Portable Dental Unit Permits

**ARTICLE 4. FEES**

R4-11-401. Retired or Disabled Licensure Renewal Fee

R4-11-403. Licensing Fees

**ARTICLE 7. DENTAL ASSISTANTS**

R4-11-701. Procedures and Functions Performed by a Dental Assistant under Supervision

R4-11-702. Limitations on Procedures or Functions Performed by a Dental Assistant under Supervision

**ARTICLE 12. CONTINUING DENTAL EDUCATION AND RENEWAL REQUIREMENTS**

R4-11-1210. Dental Therapists

**ARTICLE 15. COMPLAINTS, INVESTIGATIONS, DISCIPLINARY ACTIONS**

R4-11-1502. Dental Consultant Qualifications

R4-11-1503. Initial Complaint Review

**ARTICLE 16. ~~EXPIRED~~ DENTAL THERAPISTS**

R4-11-1601. ~~Expired~~ Duties and Qualifications

R4-11-1602. Limitation on Number Supervised

R4-11-1603. Dental Therapy Consultants

R4-11-1604. Written Collaborative Practice Agreements; Collaborative Practice Relationships

## ARTICLE 1. DEFINITIONS

### R4-11-101. Definitions

The following definitions, and definitions in A.R.S. § 32-1201, apply to this Chapter:

“Analgesia” means a state of decreased sensibility to pain produced by using nitrous oxide (N<sub>2</sub>O) and oxygen (O<sub>2</sub>) with or without ~~local anesthesia~~ Local Anesthesia.

~~“Application” means, for purposes of Article 3 only, forms designated as applications and all documents and additional information the Board requires to be submitted with an application.~~

“Business Entity” means a business organization that offers to the public professional services regulated by the Board and is established under the laws of any state or foreign country, including a sole practitioner, partnership, limited liability partnership, corporation, and limited liability company, unless specifically exempted by A.R.S. § 32-1213(J).

“Calculus” means a hard, mineralized deposit attached to the teeth.

~~“Certificate holder” means a denturist who practices denture technology under A.R.S. Title 32, Chapter 11, Article 5.~~

“Charitable Dental Clinic or Organization” means a non-profit organization meeting the requirements of 26 U.S.C. 501(c)(3) and providing dental, dental therapy, or dental hygiene services.

“Clinical evaluation” means a dental examination of a patient named in a complaint regarding the patient's dental condition as it exists at the time the examination is performed.

~~“Closed subgingival curettage” means the removal of the inner surface of the soft tissue wall of a periodontal pocket in a situation where a flap of tissue has not been intentionally or surgically opened.~~

“Controlled substance” has the meaning prescribed in A.R.S. § 36-2501(A)(3).

“Credit hour” means one clock hour of participation in a ~~recognized continuing dental education~~ Recognized Continuing Dental Education program.

“Deep sedation” is a ~~drug-induced~~ Drug-induced depression of consciousness during which a patient cannot be easily aroused but responds purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. The patient may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is maintained.

~~“Dental laboratory technician” or “dental technician” has the meaning prescribed in A.R.S. § 32-1201(7).~~

“Dentist of record” means a dentist who examines, diagnoses, and formulates treatment plans for a patient and may provide treatment to the patient.

~~“Designee” means a person to whom the Board delegates authority to act on the Board’s behalf regarding a particular task specified by this Chapter.~~

“Direct supervision” means, for purposes of Article 7 only, that a licensed dentist is present in the office and available to provide immediate treatment or care to a patient and observe a dental assistant’s work.

“Disabled” means a dentist, dental therapist, dental hygienist, or denturist has totally withdrawn from the active practice of dentistry, dental therapy, dental hygiene, or denturism due to a permanent medical disability and based on a physician’s order.

~~“Dispense for profit” means selling a drug or device for any amount above the administrative overhead costs to inventory.~~



“Documentation of attendance” means documents that contain the following information:

Name of sponsoring entity;

Course title;

Number of ~~credit hours~~ Credit Hours;

Name of speaker; and

Date, time, and location of the course.

“Drug” means:

Articles recognized, or for which standards or specifications are prescribed, in the official compendium;

Articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in the human body;

Articles other than food intended to affect the structure of any function of the human body;

or

Articles intended for use as a component of any articles specified in this definition but does not include devices or components, parts, or accessories of devices.

“Emerging scientific technology” means any technology used in the treatment of oral disease that is not currently generally accepted or taught in a recognized dental, dental therapy, or dental hygiene school and use of the technology poses material risks.

“Epithelial attachment” means the layer of cells that extends apically from the depth of the gingival (~~gum~~) sulcus (~~crevice~~) along the tooth, forming an organic attachment.

“Ex-parte communication” means a written or oral communication between a decision maker, fact finder, or Board member and one party to the proceeding, in the absence of other parties.

“General anesthesia” is a ~~drug-induced~~ Drug-induced loss of consciousness during which the patient is not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. The patient often requires assistance in maintaining a patent airway, and positive-pressure ventilation may be required because of depressed spontaneous ventilation or ~~drug-induced~~ Drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

“General supervision” means, for purposes of Article 7 only, a licensed dentist is available for consultation, whether or not the dentist is in the office, regarding procedures or treatment that the dentist authorizes and for which the dentist remains responsible.

“Homebound patient” means a person who is unable to receive dental care in a dental office as a result of a medically diagnosed disabling physical or mental condition.

“Irreversible procedure” means a single treatment, or a step in a series of treatments, that causes change in the affected hard or soft tissues and is permanent or may require reconstructive or corrective procedures to correct the changes.

~~“Jurisdiction” means the Board’s power to investigate and rule on complaints that allege grounds for disciplinary action under A.R.S. Title 32, Chapter 11 or this Chapter.~~

“Licensee” means a dentist, dental therapist, dental hygienist, dental consultant, retired licensee, or person who holds a restricted permit under A.R.S. §§ 32-1237 or 32-1292.

“Local anesthesia” is the elimination of sensations, such as pain, in one part of the body by the injection of an anesthetic ~~drug~~ Drug.

“Minimal sedation” is a minimally depressed level of consciousness that retains a patient’s ability to independently and continuously maintain an airway and respond appropriately to

light tactile stimulation, not limited to reflex withdrawal from a painful stimulus, or verbal command and that is produced by a pharmacological or non-pharmacological method or a combination thereof. Although cognitive function and coordination may be modestly impaired, ventilatory and cardiovascular functions are unaffected. In accord with this particular definition, the ~~drugs-Drugs~~ or techniques used should carry a margin of safety wide enough to render unintended loss of consciousness unlikely.

“Mobile dental permit holder” means a Licensee or dentist who holds a mobile permit under R4-11-1301, R4-11-1302, or R4-11-1303.

“Moderate sedation” is a ~~drug-induced~~ Drug-induced depression of consciousness during which a patient responds purposefully to verbal commands either alone or accompanied by light tactile stimulation, not limited to reflex withdrawal from a painful stimulus. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is maintained. The ~~drugs-Drugs~~ or techniques used should carry a margin of safety wide enough to render unintended loss of consciousness unlikely. Repeated dosing of a ~~drug-Drug~~ before the effects of previous dosing can be fully recognized may result in a greater alteration of the state of consciousness than intended by the permit holder.

“Nitrous oxide analgesia” means nitrous oxide ( $N_2O/O_2$ ) used as an inhalation analgesic.

~~“Nonsurgical periodontal treatment” means plaque removal, plaque control, supragingival and subgingival scaling, root planing, and the adjunctive use of chemical agents.~~

“Official compendium” means the latest revision of the United States Pharmacopeia and the National Formulary and any current supplement.

“Oral sedation” is the enteral administration of a ~~drug~~ Drug or ~~non-drug~~ non-Drug substance or combination inhaled and enterally administered ~~drug~~ Drug or ~~non-drug~~ non-Drug substance in a dental office or dental clinic to achieve ~~minimal~~ Minimal Sedation or ~~moderate sedation~~ Moderate Sedation.

“Parenteral sedation” is a minimally depressed level of consciousness that allows the patient to retain the ability to independently and continuously maintain an airway and respond appropriately to physical stimulation or verbal command and is induced by a pharmacological or non-pharmacological method or a combination of both methods of administration in which the ~~drug~~ Drug bypasses the gastrointestinal tract.

“~~Patient of record~~” means a ~~patient who has undergone a complete dental evaluation performed by a licensed dentist.~~

“~~Periodontal examination and assessment~~” means to ~~collect and correlate clinical signs and patient symptoms that point to either the presence of or the potential for periodontal disease.~~

“Periodontal pocket” means a pathologic fissure bordered on one side by the tooth and on the opposite side by crevicular epithelium and limited in its depth by the ~~epithelial attachment~~ Epithelial Attachment.

“Plaque” means a film-like sticky substance composed of mucoidal secretions containing bacteria and toxic products, dead tissue cells, and debris.

“~~Polish~~” “Polishing” means, for the purposes of A.R.S. § 32-1291(B) only, a procedure limited to the removal of ~~plaque~~ Plaque and extrinsic stain from exposed natural and restored tooth surfaces that utilizes an appropriate rotary instrument with rubber cup or brush and ~~polishing~~

Polishing agent. A ~~licensee~~-Licensee or dental assistant shall not represent that this procedure alone constitutes an oral ~~prophylaxis~~-Prophylaxis.

“Prescription-only device” means:

Any device that is restricted by the federal act, as defined in A.R.S. § 32-1901, to use only under the supervision of a medical practitioner; or

Any device required by the federal act, as defined in A.R.S. § 32-1901, to bear on its label the legend “Rx Only.”

“Prescription-only ~~drug~~ Drug” does not include a ~~controlled substance~~ Controlled Substance but does include:

Any ~~drug~~ Drug that, because of its toxicity or other potentiality for harmful effect, the method of its use, or the collateral measures necessary to its use, is not generally recognized among experts, qualified by scientific training and experience to evaluate its safety and efficacy, as safe for use except by or under the supervision of a medical practitioner;

Any ~~drug~~ Drug that is limited by an approved new ~~drug~~ Drug application under the federal act or A.R.S. § 32-1962 to use under the supervision of a medical practitioner;

Every potentially harmful ~~drug~~ Drug, the labeling of which does not bear or contain full and adequate directions for use by the consumer; or

Any ~~drug~~ Drug required by the federal act to bear on its label the legend “RX Only.”

“President’s designee” means the Board’s executive director, an investigator, or a Board member acting on behalf of the Board president.

“Preventative and therapeutic agents” means substances ~~used in relation to dental hygiene procedures~~ that affect the hard or soft oral tissues to aid in preventing or treating oral disease.

“Prophylaxis” means a ~~sealing~~ Scaling and ~~polishing~~ Polishing procedure performed on patients with healthy tissues to remove coronal ~~plaque~~ Plaque, ~~calculus~~ Calculus, and stains.

~~“Public member” means a person who is not a dentist, dental hygienist, dental assistant, denturist, or dental technician.~~

“Recognized continuing dental education” means a program whose content directly relates to the art and science of oral health and treatment, provided by a recognized dental school as defined in A.R.S. § 32-1201(18), recognized dental therapy school, recognized dental hygiene school as defined in A.R.S. § 32-1201(17), or recognized denturist school as defined in A.R.S. § 32-1201(19), or sponsored by a national or state dental, dental therapy, dental hygiene, or denturist association, American Dental Association, Continuing Education Recognition Program (~~ADA-CERP~~) or Academy of General Dentistry, Program Approval for Continuing Education (~~AGD-PACE~~) approved provider, dental, dental therapy, dental hygiene, or denturist ~~study club~~ Study Club, governmental agency, commercial dental supplier, non-profit organization, accredited hospital, or programs or courses approved by other state, district, or territorial dental licensing boards.

“Restricted permit holder” means a dentist who meets the requirements of A.R.S. § 32-1237, or a dental hygienist who meets the requirements of A.R.S. § 32-1292 and is issued a restricted permit by the Board.

“Retired” means a dentist, dental therapist, dental hygienist, or denturist is at least 65 years old and has totally withdrawn from the active practice of dentistry, dental therapy, dental hygiene, or denturism.

“Root planing” means a definitive treatment procedure designed to remove cementum or surface dentin that is rough, impregnated with ~~calculus~~ Calculus, or contaminated with toxins or microorganisms.

“Scaling” means use of instruments on the crown and root surfaces of the teeth to remove ~~plaque~~ Plaque, ~~calculus~~ Calculus, and stains from these surfaces.

“Section 1301 permit” means a permit to administer ~~general anesthesia~~ General Anesthesia and ~~deep sedation~~ Deep Sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (~~CRNA~~) under Article 13.

“Section 1302 permit” means a permit to administer ~~parenteral sedation~~ Parenteral Sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (~~CRNA~~) under Article 13.

“Section 1303 permit” means a permit to administer ~~oral sedation~~ Oral Sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (~~CRNA~~) under Article 13.

“Section 1304 permit” means a permit to employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (~~CRNA~~) under Article 13.

“Study club” means a group of at least five Arizona licensed dentists, dental therapists, dental hygienists, or denturists who provide written course materials or a written outline for a continuing education presentation that meets the requirements of Article 12.

“Treatment records” means all documentation related directly or indirectly to the dental treatment of a patient.

## ARTICLE 2. LICENSURE BY CREDENTIAL

### R4-11-201. Clinical Examination; Requirements

- A. If an applicant is applying under A.R.S. §§ 32-1240(A), 32-1276.07, or 32-1292.01(A), the Board shall ensure that the applicant has passed the clinical examination of A.R.S. §§ 32-1233(2) for dentists, or 32-1276.01(B)(3)(a) for dental therapists, or 32-1285(2) for dental hygienists, notwithstanding each respective statute's timing stipulation. ~~of another state, United States territory, District of Columbia or a regional testing agency~~ Satisfactory completion of the clinical examination may be demonstrated by ~~one of the following:~~
1. ~~Certified~~ certified documentation, sent directly from another state, United States territory, District of Columbia or a ~~regional~~ testing agency that meets the requirements of A.R.S. §§ 32-1233(2) for dentists, or 32-1276.01(B)(3)(a) for dental therapists, or 32-1285(2) for dental hygienists, notwithstanding each respective statute's timing stipulation, that confirms successful completion of the clinical examination or multiple examinations administered by the state, United States territory, District of Columbia or ~~regional~~ testing agency. The certified documentation shall contain the name of the applicant, date of examination or examinations and proof of a passing score; ~~or~~
  2. ~~Certified documentation sent directly from another state, United States territory or District of Columbia dental board that shows the applicant passed that state's, United States territory's or District of Columbia's clinical examination before that state's, United States territory's or District of Columbia's participation in a regional examination~~ The certified documentation shall contain the name of applicant, date of examination or examinations and proof of a passing score.



**B.** An applicant shall meet the licensure requirements in R4-11-301 and R4-11-303.

**R4-11-202. Dental Licensure by Credential; Application**

**A.** A dentist applying under A.R.S. § 32-1240(A) shall comply with all other applicable requirements in A.R.S. Title 32, Chapter 11 and this Article.

**B.** A dentist applying under A.R.S. § 32-1240(A)(1) shall:

1. Have a current dental license in another state, territory or district of the United States;
2. Submit a written affidavit affirming that the dentist has practiced dentistry for a minimum of 5000 hours during the five years immediately before applying for licensure by credential. For purposes of this subsection, dental practice includes experience as a dental educator at a dental program accredited by the ~~American Dental Association~~ Commission on Dental Accreditation or another post-secondary dental education program accrediting agency recognized by the U.S. Department of Education, or employment as a dentist in a public health setting;
3. Submit a written affidavit affirming that the applicant has complied with the continuing dental education requirement of the state in which the applicant is currently licensed; ~~and~~
4. Provide evidence regarding the clinical examination by complying with ~~one of the subsections in R4-11-201(A)(1);~~ and
5. Pass the Arizona jurisprudence examination with a minimum score of 75%.

**C.** ~~A dentist applying under A.R.S. § 32-1240(A)(2) shall submit certified documentation sent directly from the applicable state, United States territory, District of Columbia or regional~~

~~testing agency to the Board that contains the name of applicant, date of examination or examinations and proof of a passing score.~~

**D.C.** For any application submitted under A.R.S. § 32-1240(A), the Board may request additional clarifying evidence required under ~~the applicable subsection in~~ R4-11-201(A)(1).

**E.D.** An applicant for dental licensure by credential shall pay the fee prescribed in A.R.S. § 32-1240, except the fee is reduced by 50% for applicants who will be employed or working under contract in:

1. Underserved areas, such as declared or eligible Health Professional Shortage Areas (~~HPSAs~~); or
2. Other facilities caring for underserved populations as recognized by the Arizona Department of Health Services and approved by the Board.

**F.E.** An applicant for dental licensure by credential who works in areas or facilities described in subsection ~~(E)~~ (D) shall:

1. Commit to a three-year, exclusive service period,
2. File a copy of a contract or employment verification statement with the Board, and
3. As a ~~licensee~~ Licensee, submit an annual contract or employment verification statement to the Board by December 31 of each year.

**G.F.** A ~~licensee's~~ Licensee's failure to comply with the requirements in subsection ~~(F)~~ (E) is considered unprofessional conduct and may result in disciplinary action based on the circumstances of the case.

**R4-11-203. Dental Hygienist Licensure by Credential; Application**

- A. A dental hygienist applying under A.R.S. § 32-1292.01(A) shall comply with all other applicable requirements in A.R.S. Title 32, Chapter 11 and this Article.
- B. A dental hygienist applying under A.R.S. § 32-1292.01(A)(1) shall:
1. Have a current dental hygienist license in another state, territory, or district of the United States;
  2. Submit a written affidavit affirming that the applicant has practiced as a dental hygienist for a minimum of 1000 hours during the two years immediately before applying for licensure by credential. For purposes of this subsection, dental hygienist practice includes experience as a dental hygienist educator at a dental program accredited by the ~~American Dental Association~~ Commission on Dental Accreditation or another post-secondary dental education program accrediting agency recognized by the U.S. Department of Education, or employment as a dental hygienist in a public health setting;
  3. Submit a written affidavit affirming that the applicant has complied with the continuing dental hygienist education requirement of the state in which the applicant is currently licensed; ~~and~~
  4. Provide evidence regarding the clinical examination by complying with ~~one of the subsections in R4-11-201(A)(1);~~ and
  5. Pass the Arizona jurisprudence examination with a minimum score of 75%.
- C. ~~A dental hygienist applying under A.R.S. § 32-1292.01(A)(2) shall submit certified documentation sent directly from the applicable state, United States territory, District of~~

~~Columbia or regional testing agency to the Board that contains the name of applicant, date of examination or examinations and proof of a passing score.~~

**D. C.** For any application submitted under A.R.S. § 32-1292.01(A), the Board may request additional clarifying evidence as required under ~~the applicable subsection in~~ R4-11-201(A).

**E. D.** An applicant for dental hygienist licensure by credential shall pay the fee prescribed in A.R.S. § 32-1292.01, except the fee is reduced by 50% for applicants who will be employed or working under contract in:

1. Underserved areas such as declared or eligible Health Professional Shortage Areas (HPSAs); or
2. Other facilities caring for underserved populations, as recognized by the Arizona Department of Health Services and approved by the Board.

**F. E.** An applicant for dental hygienist licensure by credential who works in areas or facilities described in subsection ~~(E)~~ (D) shall:

1. Commit to a three-year exclusive service period,
2. File a copy of a contract or employment verification statement with the Board, and
3. As a ~~licensee~~ Licensee, submit an annual contract or employment verification statement to the Board by December 31 of each year.

**G. F.** A ~~licensee's~~ Licensee's failure to comply with the requirements in ~~R4-11-203(F)~~ R4-11-203(E) is considered unprofessional conduct and may result in disciplinary action based on the circumstances of the case.

**R4-11-206. ~~Repealed~~ Dental Therapist Licensure by Credential; Application**

**A.** A dental therapist applying under A.R.S. § 32-1276.07 shall comply with all other applicable requirements in A.R.S. Title 32, Chapter 11 and this Article.

**B.** A dental therapist applying under A.R.S. § 32-1276.07 shall:

1. Have a current dental therapy license in another state, territory or district of the United States with substantially the same scope of practice as defined in A.R.S. § 32-1276.03;
2. Submit a written affidavit affirming that the applicant has practiced as a dental therapist for a minimum of 3000 hours during the five years immediately before applying for licensure by credential. For purposes of this subsection, dental therapy practice includes experience as a dental therapy educator at a dental program accredited by the Commission on Dental Accreditation or another post-secondary dental education program accrediting agency recognized by the U.S. Department of Education, or employment as a dental therapist in a public health setting;
3. Submit a written affidavit affirming that the applicant has complied with the continuing dental therapy education requirement of the state in which the applicant is currently licensed; and
4. Provide evidence showing that five years or more before applying for licensure under this section, the applicant completed the clinical examination by complying with R4-11-201(A);
5. Submit official transcripts to the Board directly from a recognized dental therapy school as defined by A.R.S. § 32-1201(21) or an approved third party showing a degree was conferred to the applicant; and

6. Not be required to obtain an Arizona dental hygienist license, if the dental therapist submits one of the following:

a. Certified documentation of a current or past dental hygiene license sent directly from the applicable state, United States territory, District of Columbia to the Board; or

b. Official transcripts sent to the Board directly from a recognized dental hygiene school as defined by A.R.S. § 32-1201(19) or an approved third party showing a degree was conferred to the applicant; or

c. A written affidavit from a recognized dental therapy school as defined in A.R.S. § 32-1201(21) affirming that all dental hygiene procedures defined in A.R.S. § 32-1281 were part of the education the applicant received.

**C.** For any application submitted under A.R.S. § 32-1276.07, the Board may request additional clarifying evidence required under R4-11-201(A).

**D.** If an applicant meets all the requirements set forth in this rule except that their current dental therapy license is from a state, territory, or district of the United States that does not include one or more of the following procedures in its legally defined scope, then the applicant must provide evidence of competency before being granted a dental therapy license by credential:

1. Fabricating soft occlusal guards;

2. Administering Nitrous Oxide Analgesia;

3. Performing nonsurgical extractions of periodontally diseased permanent teeth that exhibit plus or grade three mobility and that are not impacted, fractured, unerupted or in need of sectioning for removal;

4. Suturing; or
5. Placing space maintainers.

**E.** The board will accept the any of following as evidence of competency in the  
aforementioned procedures:

1. A certificate or credential in the procedure(s) issued by a state licensing  
jurisdiction; or
2. A signed affidavit from a recognized dental therapy school, recognized dental  
hygiene school, or recognized dental school, affirming that the applicant  
successfully completed academic coursework that included both theory and  
supervised clinical practice in the procedure(s).

**F.** Subject to A.R.S. § 32-1276.04, an applicant for licensure under this section shall pay the  
fee prescribed in A.R.S. § 32-1276.07, except the fee is reduced by 50% for applicants who  
will be employed or working under contract in:

1. Underserved areas, such as declared or eligible Health Professional Shortage Areas;  
or
2. Other facilities caring for underserved populations as recognized by the Arizona  
Department of Health Services and approved by the Board.

**G.** An applicant for dental therapist licensure by credential who works in areas or facilities  
described in subsection (F) shall:

1. Commit to a three-year, exclusive service period,
2. File a copy of a contract or employment verification statement with the Board, and
3. As a Licensee, submit an annual contract or employment verification statement to  
the Board by December 31 of each year.

**H.** A Licensee's failure to comply with the requirements in subsection (G) is considered unprofessional conduct and may result in disciplinary action based on the circumstances of the case.

**ARTICLE 3. EXAMINATIONS, LICENSING QUALIFICATIONS, APPLICATION AND RENEWAL, TIME-FRAMES**

**R4-11-301. Application**

**A.** An applicant for licensure or certification shall provide the following information and documentation:

1. A sworn statement of the applicant's qualifications for the license or certificate on a form provided by the Board;
2. A photograph of the applicant that is no more than 6 months old;
3. An official, sealed transcript sent directly to the Board from either:
  - a. The applicant's dental, dental therapy, dental hygiene, or denturist school, or
  - b. A verified third-party transcript provider.
4. Except for a dental consultant license applicant, a dental, dental therapy, and dental hygiene license applicant shall provide proof of successfully completing a clinical examination by submitting:
  - a. If applying for dental licensure by examination, a copy of the certificate or scorecard sent to the Board directly from the Western Regional Examining Board a clinical examination administered by a state or testing agency that meets the requirements of A.R.S. § 32-1233(2), indicating that the applicant passed a state or regional testing agency the Western Regional Examining



~~Board~~ examination that meets the requirements of A.R.S. § 32-1233(2) within the five years immediately before the date the application is filed with the Board;

b. If applying for dental therapy licensure by examination, a copy of the certificate or scorecard sent to the Board directly from a clinical examination administered by a state, United States territory, District of Columbia or testing agency that meets the requirements of A.R.S. § 32-1276.01(B)(3)(a). The certificate or scorecard must indicate that the applicant passed the examination within the five years immediately before the date the application is filed with the Board. The application must also include the applicant's Arizona dental hygiene license number;

~~b.c.~~ If applying for dental hygiene licensure by examination, a copy of the certificate or scorecard sent to the Board directly from the Western Regional Examining Board or an Arizona Board approved a clinical examination administered by a state, United States territory, District of Columbia or ~~regional~~ testing agency that meets the requirements of A.R.S. § 32-1285(2). The certificate or scorecard must indicate that the applicant passed the examination within the five years immediately before the date the application is filed with the Board;~~or~~

e. ~~If applying for licensure by credential, certified documentation sent directly from the applicable state, United States territory, District of Columbia or regional testing agency to the Board containing the name of the applicant, date of examination or examinations and proof of a passing score;~~

5. Except for a dental consultant license applicant as provided in A.R.S. § 32-1234(A)(7), dental and dental hygiene license applicants must have an official scorecard sent directly from the National Board examination to the Board;
6. A copy showing the expiration date of the applicant's current cardiopulmonary resuscitation healthcare provider level certificate from the American Red Cross, the American Heart Association, or another certifying agency that follows the same procedures, standards, and techniques for ~~CPR~~ cardiopulmonary resuscitation training and certification as the American Red Cross or American Heart Association;
7. A license or certification verification from any other jurisdiction—in which an applicant is licensed or certified, sent directly from that jurisdiction to the Board. If the license verification cannot be sent directly to the Board from the other jurisdiction, the applicant must submit a written affidavit affirming that the license verification submitted was issued by the other jurisdiction;
8. If ~~an a dental or dental hygiene~~ applicant has been licensed or certified in another jurisdiction ~~for more than six months~~, a copy of the self-inquiry from the National Practitioner Data Bank that is no more than 30 calendar days old;
- ~~9. If a dentist applicant has been certified in another jurisdiction for more than six months, a copy of the self inquiry from the Health Integrity and Protection Data Bank that is no more than 30 days old;~~
- ~~10.~~9. If the applicant is in the military or employed by the United States government, a letter ~~of endorsement~~ sent to the Board directly from the applicant's commanding officer or supervisor ~~that confirms~~ verifying the applicant's applicant is licensed or

certified by the military service or United States government ~~employment record~~;  
and

~~11.10.~~ The jurisprudence examination fee paid by a method authorized by law.

**B.** The Board may request that an applicant provide:

1. An official copy of the applicant's dental, dental therapy, dental hygiene, or dentist school diploma from the issuing institution;
2. A copy of a certified document that indicates the reason for a name change if the applicant's application contains different names;
3. Written verification of the applicant's work history; and
4. A copy of a high school diploma or equivalent certificate.

**C.** An applicant shall pass the Arizona jurisprudence examination with a minimum score of 75%.

**R4-11-303. Application Processing Procedures: Issuance, Denial, and Renewal of Dental Licenses, Dental Therapy Licenses, Restricted Permits, Dental Hygiene Licenses, Dental Consultant Licenses, Denturist Certificates, Drug or Device Dispensing Registrations, Business Entity Registration and Mobile Dental Facility and Portable Dental Unit Permits**

**A.** The Board office shall complete an administrative completeness review within ~~24~~ 30 calendar days of the date of receipt of an application for a license, certificate, permit, or registration.

1. Within ~~14~~ 30 calendar days of receiving an initial or renewal application for a dental license, restricted permit, dental therapy license, dental hygiene license, dental consultant license, dentist certificate, ~~drug dispensing registration, business entity~~ Business Entity registration, mobile dental facility or portable dental unit permit,

the Board office shall notify the applicant, in writing, whether the application package is complete or incomplete.

2. If the application package is incomplete, the Board office shall provide the applicant with a written notice that includes a comprehensive list of the missing information. The ~~24~~ 30 calendar day time-frame for the Board office to finish the administrative completeness review is suspended from the date the notice of incompleteness is served until the applicant provides the Board office with all missing information.
  3. If the Board office does not provide the applicant with notice regarding administrative completeness, the application package shall be deemed complete ~~24~~ 30 calendar days after receipt by the Board office.
- B.** An applicant with an incomplete application package shall submit all missing information within 60 calendar days of service of the notice of incompleteness.
- C.** Upon receipt of all missing information, the Board office shall notify the applicant, in writing, within ~~40~~ 30 calendar days, that the application package is complete. If an applicant fails to submit a complete application package within the time allowed in subsection (B), the Board office shall close the applicant's file. An applicant whose file is closed and who later wishes to obtain a license, certificate, permit, or registration shall apply again as required in R4-11-301.
- D.** The Board shall not approve or deny an application until the applicant has fully complied with the requirements of A.A.C. Title 4, Chapter 11, Article 3.

- E.** The Board shall complete a substantive review of the applicant's qualifications in no more than 90 calendar days from the date on which the administrative completeness review of an application package is complete.
1. If the Board finds an applicant to be eligible for a license, certificate, permit, or registration and grants the license, certificate, permit, or registration, the Board office shall notify the applicant in writing.
  2. If the Board finds an applicant to be ineligible for a license, certificate, permit, or registration, the Board office shall issue a written notice of denial to the applicant that includes:
    - a. Each reason for the denial, with citations to the statutes or rules on which the denial is based;
    - b. The applicant's right to request a hearing on the denial, including the number of days the applicant has to file the request;
    - c. The applicant's right to request an informal settlement conference under A.R.S. § 41-1092.06; and
    - d. The name and telephone number of an agency contact person who can answer questions regarding the application process.
  3. If the Board finds deficiencies during the substantive review of an application package, the Board office may issue a comprehensive written request to the applicant for additional documentation. An additional supplemental written request for information may be issued upon mutual agreement between the Board or Board office and the applicant.

4. The 90-day time-frame for a substantive review of an applicant's qualifications is suspended from the date of a written request for additional documentation until the date that all documentation is received. The applicant shall submit the additional documentation before the next regularly scheduled Board meeting.
  5. If the applicant and the Board office mutually agree in writing, the 90-day substantive review time-frame may be extended once for no more than 28 days.
- F.** The following time-frames apply for an initial or renewal application governed by this Section:
1. Administrative completeness review time-frame: ~~24~~ 30 calendar days.
  2. Substantive review time-frame: 90 calendar days.
  3. Overall time-frame: ~~114~~ 120 calendar days.
- G.** An applicant whose license is denied has a right to a hearing, an opportunity for rehearing, and, if the denial is upheld, may seek judicial review pursuant to A.R.S. Title 41, Chapter 6, Article 10, and A.R.S. Title 12, Chapter 7, Article 6.

#### **ARTICLE 4. FEES**

##### **R4-11-401. Retired or Disabled Licensure Renewal Fee**

As expressly authorized under A.R.S. § 32-1207(B)(3)(c), the licensure renewal fee for a ~~retired~~ Retired Licensee or disabled Disabled Licensee dentist or dental hygienist is \$15 and shall be paid by a method authorized by law.

**R4-11-403. Licensing Fees**

A. As expressly authorized under A.R.S. §§ 32-1236, 32-1276.02, 32-1287, and 32-1297.06, the Board establishes and shall collect the following licensing fees paid by a method authorized by law:

1. Dentist triennial renewal fee: \$510;
2. Dentist prorated initial license fee: \$110;
3. Dental therapist triennial renewal fee: \$375;
4. Dental therapist prorated initial license fee: \$80;
5. Dental hygienist triennial renewal fee: \$255;
- ~~4.6.~~ Dental hygienist prorated initial license fee: \$55;
- ~~5.7.~~ Denturist triennial renewal fee: \$233; and
- ~~6.8.~~ Denturist prorated initial license fee: \$46.

B. The following license-related fees are established in or expressly authorized by statute. The Board shall collect the following fees paid by a method authorized by law:

1. Jurisprudence examination fee:
  - a. Dentists: \$300;
  - b. Dental therapists: \$200;
  - c. Dental ~~Hygienists~~ hygienists: \$100; and
  - ~~e.d.~~ Denturists: \$250.
2. Licensure by credential fee:
  - a. Dentists: \$2,000; and
  - b. Dental therapists: \$1,500;
  - c. Dental ~~Hygienists~~ hygienists: \$1,000.

3. Penalty to reinstate an expired license or certificate: \$100 for a dentist, dental therapist, dental hygienist, or denturist in addition to renewal fee specified under subsection (A).
4. Penalty for a dentist, dental therapist, dental hygienist, or denturist who fails to notify Board of a change of mailing address:
  - a. Failure after 10 days: \$50; and
  - b. Failure after 30 days: \$100.



## ARTICLE 7. DENTAL ASSISTANTS

### R4-11-701. Procedures and Functions Performed by a Dental Assistant under Supervision

A. A dental assistant may perform the following procedures and functions under the ~~direct supervision~~ Direct Supervision of a licensed dentist or a licensed dental therapist:

1. Place dental material into a patient's mouth in response to a licensed dentist's or licensed dental therapist's instruction;
2. Cleanse the supragingival surface of the tooth in preparation for:
  - a. The placement of bands, crowns, and restorations;
  - b. Dental dam application;
  - c. Acid etch procedures; and
  - d. Removal of dressings and packs;
3. Remove excess cement from inlays, crowns, bridges, and orthodontic appliances with hand instruments;
4. Remove temporary cement, interim restorations, and periodontal dressings with hand instruments;
5. Remove sutures;
6. Place and remove dental dams and matrix bands;
7. Fabricate and place interim restorations with temporary cement;
8. Apply sealants;
9. Apply topical fluorides;
10. Take final digital impressions for any activating orthodontic appliance, fixed, or removable prosthesis;

~~10.11.~~ Prepare a patient for ~~nitrous oxide and oxygen analgesia~~ Nitrous Oxide Analgesia administration upon the direct instruction and presence of a dentist or licensed dental therapist; or

~~11.12.~~ Observe a patient during ~~nitrous oxide and oxygen analgesia~~ Nitrous Oxide Analgesia as instructed by the dentist or licensed dental therapist.

**B.** A dental assistant may perform the following procedures and functions under the general supervision of a licensed dentist or a licensed dental therapist:

1. Train or instruct patients in oral hygiene techniques, preventive procedures, dietary counseling for caries and ~~plaque~~ Plaque control, and provide pre-and post-operative instructions relative to specific office treatment;
2. Collect and record information pertaining to extraoral conditions; and
3. Collect and record information pertaining to existing intraoral conditions.

**R4-11-702. Limitations on Procedures or Functions Performed by a Dental Assistant under Supervision**

A dental assistant shall not perform the following procedures or functions:

1. A procedure which by law only licensed dentists, licensed dental therapists, licensed dental hygienists, or certified denturists can perform;
2. Intraoral carvings of dental restorations or prostheses;
3. Final jaw registrations;
4. Taking final impressions, other than digital impressions, for any activating orthodontic appliance, fixed or removable prosthesis;
5. Activating orthodontic appliances; or
6. An ~~irreversible procedure~~ Irreversible Procedure.

**ARTICLE 12. CONTINUING DENTAL EDUCATION AND RENEWAL  
REQUIREMENTS**

**R4-11-1210. Dental Therapists**

Dental therapists shall complete 54 hours of Recognized Continuing Dental Education in each renewal period as follows:

1. At least 31 Credit Hours in any one or more of the following areas: Dental and medical health, dental therapy services, dental therapy treatment planning, preventive services, dental diagnosis and treatment planning, dental recordkeeping, dental clinical procedures, managing medical emergencies, pain management, dental public health, periodontal disease, care of implants, maintenance of cosmetic restorations and sealants, radiology safety and techniques, and courses in corrective and restorative oral health and basic dental sciences, which may include current research, new concepts in dentistry, and behavioral and biological sciences that are oriented to dentistry;
2. No more than 14 Credit Hours in any one or more of the following areas: Dental practice organization and management, patient management skills, and methods of health care delivery;
3. At least three Credit Hours in infectious diseases or infectious disease control;
4. At least three Credit Hours in cardiopulmonary resuscitation healthcare provider level, advanced cardiac life support or pediatric advanced life support. Coursework may be completed online if the course requires a physical demonstration of skills; and
5. At least three Credit Hours in any one or more of the following areas: ethics, risk management, chemical dependency, tobacco cessation, or Arizona dental jurisprudence.

## ARTICLE 15. COMPLAINTS, INVESTIGATIONS, DISCIPLINARY ACTION

### R4-11-1502. Dental Consultant Qualifications

A dentist, dental therapist, dental hygienist, or denturist approved as a Board dental consultant shall:

1. Possess a valid license or certificate to practice in Arizona;
2. Have practiced at least five years in Arizona; and
3. Not have been disciplined by the Board within the past five years.

### R4-11-1503. Initial Complaint Review

A. The Board's procedures for complaint notification are:

1. ~~The Board personnel~~ shall notify the ~~complainant and licensee~~ Licensee, certificate holder denturist, business entity Business Entity or mobile dental permit holder Mobile Dental Permit Holder by certified U.S. Mail when the following occurs:
  - a. A formal interview is scheduled, and
  - b. ~~The complaint is tabled,~~
  - e. ~~A postponement or continuance is granted, and~~
  - d. A subpoena, notice, or order is issued.
2. The Board shall notify the Licensee, denturist, Business Entity, or Mobile Dental Permit Holder by U.S. mail or email when the following occurs:
  - a. The complaint is tabled, and
  - b. The Board grants a postponement or continuance.
- 2.3. ~~Board personnel~~ shall provide the ~~licensee~~ Licensee, certificate holder denturist, business entity Business Entity, or mobile dental permit holder Mobile Dental Permit Holder with a copy of the complaint.

~~3.4.~~ If a complaint alleges a violation of the state or federal criminal code, the Board shall refer the complaint to the proper law enforcement agency.

**B.** The Board's procedures for complaints referred to ~~clinical evaluation~~ Clinical Evaluation are:

1. Except as provided in subsection (B)(1)(a), the ~~president's designee~~ President's Designee shall appoint one or more dental consultants to perform a ~~clinical evaluation~~ Clinical Evaluation. If there is more than one dental consultant, the dental consultants do not need to be present at the same time.

a. If the complaint involves a dental hygienist, dentist, dental therapist, or dentist who is a recognized specialist in one of the areas listed in R4-11-1102(B), the ~~president's designee~~ President's Designee shall appoint a dental consultant from that area of practice or specialty.

b. The Board shall not disclose the identity of the ~~licensee~~ Licensee to a dental consultant performing a ~~clinical examination~~ Clinical Evaluation before the Board receives the dental consultant's report.

2. The dental consultant shall prepare and submit a ~~clinical evaluation~~ Clinical Evaluation report. The ~~president's designee~~ President's Designee shall provide a copy of the ~~clinical evaluation~~ Clinical Evaluation report to the ~~licensee~~ Licensee or ~~certificate holder dentist~~. The ~~licensee~~ Licensee or ~~certificate holder dentist~~ may submit a written response to the ~~clinical evaluation~~ Clinical Evaluation report.

#### **ARTICLE 16. ~~EXPIRED~~ DENTAL THERAPISTS**

**R4-11-1601.—~~Expired~~ Duties and Qualifications**

- A.** A dental therapist may perform a procedure not specifically authorized by A.R.S. § 32-1276.03 when all of the following conditions are satisfied:
1. The procedure is recommended or prescribed by the supervising dentist;
  2. The dental therapist has received training by a recognized dental school, recognized dental therapy school, recognized dental hygiene school, or recognized denturist school, as defined under A.R.S. § 32-1201, to perform the procedure in a safe manner; and
  3. The procedure is performed under the Direct Supervision of, or according to, a written collaborative practice agreement with a licensed dentist.
- B.** A dental therapist may administer Nitrous Oxide Analgesia as authorized by A.R.S. § 32-1276.03(B)(12) if the dental therapist submits proof directly from an issuing institution of completing courses in the administration of Nitrous Oxide Analgesia offered by a recognized dental school, recognized dental therapy school, or recognized dental hygiene school, as defined under A.R.S. § 32-1201, that include both theory and supervised clinical practice in the procedures.
- C.** A dental therapist may perform suturing and suture removal as authorized by A.R.S. § 32-1276.03(B)(21) if the dental therapist submits proof directly from an issuing institution of completing courses in suturing and suture removal offered by a recognized dental school, recognized dental therapy school, or recognized dental hygiene school, as defined under A.R.S. § 32-1201, that include both theory and supervised clinical practice in the procedures.

**D.** A dental therapist may perform an Irreversible Procedure only if it is specifically authorized by A.R.S. § 32-1276.03 or meets the conditions of R4-11-1601(A).

**R4-11-1602. Limitation on Number Supervised**

A dentist shall not provide direct supervision for more than three dental therapists while the dental therapists are providing services or performing procedures under A.R.S. § 32-1276.03 or R4-11-1601.

**R4-11-1603. Dental Therapy Consultants**

After submission of a current curriculum vitae or resume and approval by the Board, dental therapy consultants may:

1. Participate in Board-related procedures, including a Clinical Evaluation, investigation of complaints concerning infection control, insurance fraud, or the practice of supervised personnel, and any other procedures not directly related to evaluating a dentist's or denturist's quality of care; and
2. Participate in onsite office evaluations for infection control, as part of a team.

**R4-11-1604. Written Collaborative Practice Agreements; Collaborative Practice Relationships**

**A.** A dental therapist shall submit a signed affidavit to the Board affirming that:

1. The Collaborative Practice Agreement complies with all the requirements listed in A.R.S. § 32-1276.04.
2. The dental therapist is and will be continuously certified in basic life support, including healthcare provider level cardiopulmonary resuscitation and training in automated external defibrillator.

3. The dental therapist is in compliance with the continuing dental education requirements of this state.
- B.** Each dentist who enters into a Collaborative Practice Agreement shall be available telephonically or electronically during the business hours of the dental therapist to provide an appropriate level of contact, communication, and consultation.
- C.** A Collaborative Practice Agreement shall include a provision for a substitute dentist, to cover an extenuating circumstance that renders the affiliated practice dentist unavailable for contact, communication, and consultation with the dental therapist.
- D.** A Collaborative Practice Agreement shall include a signed and dated statement from the dentist providing Direct Supervision, verifying the dental therapist's completion of 1000 hours of dental therapy clinical practice according to A.R.S. § 32-1276.04(B).
- E.** A Collaborative Practice Agreement shall be between one dentist and one dent



**ECONOMIC, SMALL BUSINESS, AND CONSUMER IMPACT STATEMENT**

**TITLE 4. PROFESSIONS AND OCCUPATIONS**

**CHAPTER 11. STATE BOARD OF DENTAL EXAMINERS**

1. Identification of the rulemaking:

The Arizona State Board of Dental Examiners (“Board”) needs to amend its rules related to dental therapy license requirements.

a. The conduct and its frequency of occurrence that the rule is designed to change:

The Board needs to amend its rules to address dental therapy licenses, which was created by the Arizona State Legislature, and make other necessary changes to ensure the rules are clear, concise and consistent.

b. The harm resulting from the conduct the rule is designed to change and the likelihood it will continue to occur if the rule is not changed:

The Board will *not* be compliant with a law passed and signed into effect in May 2017 – A.R.S. §§ 32-1201 et seq, more specifically A.R.S. §§ 32-1276 – 32-1276.08. The Board needs to allow individuals educated in dental therapy the ability to obtain a dental therapy license in order to treat patients, in Arizona, who need dental services that dental therapists provide.

c. The estimated change in frequency of the targeted conduct expected from the rule change:

There will be no change in the frequency of reporting dental therapy licenses.

2. A brief summary of the information included in the economic, small business, and consumer impact statement:

Governor Ducey signed a bill into law in May 2017, which allows licensed dental therapist to practice in Arizona. The previous Board administration never created rules for this new law; therefore, the new law has not been fully implemented. There is little to no economic, small business, or consumer impact, other than the cost to the Board to prepare the rule package, because the rulemaking simply clarifies statutory requirements that already exist. Thus, the economic impact is minimized.

///

///

///

3. The person to contact to submit or request additional data on the information included in the economic, small business, and consumer impact statement:

Name: Ryan Edmonson, Executive Director  
Address: Arizona State Board of Dental Examiners  
1740 W. Adams St., Ste. 2470  
Phoenix, AZ 85007  
Telephone: (602) 542-4493  
E-Mail: [ryan.edmonson@dentalboard.az.gov](mailto:ryan.edmonson@dentalboard.az.gov)

4. Persons who will be directly affected by, bear the costs of, or directly benefit from the rulemaking:

The costs for a dental therapist license is the responsibility of the applicant. It is the individual's responsibility to obtain the required education and license to practice in the State of Arizona. The benefit of the new license increases access for rural areas of the state, which includes tribal communities. Additionally, this allows tribal communities to attract dental providers in their area and retain licensees.

5. Cost-benefit analysis:

- a. Costs and benefits to state agencies directly affected by the rulemaking including the number of new full-time employees at the implementing agency required to implement and enforce the proposed rule:

The Board is the only state agency affected by the rulemaking amendment and there will *not* be any costs, including the hiring of more personnel to manage the effects of the amendment. The benefits, as stated above, provides access to rural areas of the state where access to dental services can increase.

- b. Costs and benefits to political subdivisions directly affected by the rulemaking:

N/A

- c. Costs and benefits to businesses directly affected by the rulemaking:

No new costs will be incurred to businesses; this is a new type of dental license.

6. Impact on private and public employment:

N/A

7. Impact on small businesses:

a. Identification of the small business subject to the rulemaking:

The Board licensees, but this is no different than currently. There is no financial impact to small businesses other than dental businesses, but there are *no* new costs.

b. Administrative and other costs required for compliance with the rulemaking:

Negligible

c. Description of methods that may be used to reduce the impact on small businesses:

Minimal, if any, and only based on the cost to employers who pay for the licensee fees for its hired dental professionals.

8. Cost and benefit to private persons and consumers who are directly affected by the rulemaking:

No new costs will be incurred to individuals. In fact, the public in rural areas will benefit by having more access to care for dental services who may not currently have immediate access to this type of care.

9. Probable effects on state revenues:

No new expenses are expected at this time. We cannot determine the probable effects on state revenues, because the Board does not know how many people will apply for a dental therapy license, nor can they presume to know.

10. Less intrusive or less costly alternative methods considered:

The Board believes that by amending its rules this will be a benefit the dental community and the public they serve.



Dear Mr. Edmonson,

The Arizona Oral Health Coalition and other oral health stakeholders and community members are grateful for the opportunity to submit public comments on the proposed rules required to implement changes to Arizona Revised Statutes, Title 32, Chapter 11, as amended in 2018 by H.B. 2235, authorizing the licensure and regulation of dental therapy.

The coalition recommends the Arizona Board of Dental Examiners consider the following amendments to the proposed dental therapy rules as outlined below:

Concerning: R4-11-206. Dental Therapist Licensure by Credential; Application

B. A dental therapist applying under A.R.S. § 32-1276.07 shall:

5. Submit official transcripts to the Board directly from a recognized dental therapy school as defined by A.R.S. § 32-1201(21) or an approved third party showing a degree was conferred to the applicant; and

Request: Strike all language of Subsection (B)(5).

Justification: Board adopted language in Rule R-11-206(B)(5), requires dental therapists applying for licensure by credential to submit official transcripts to the Board from a “recognized dental therapy school” as defined by A.R.S § 32-1201(21) or an approved third party showing such a degree was conferred to the applicant. This condition is not a requirement for dentists or dental hygienists seeking licensure by credential, singling out licensed dental therapists and holding them to a higher standard than their counterparts.

In addition to the challenge of holding dental therapists to a different standard, this condition is burdensome for the applicant. Further, it poses a barrier to licensure for dental therapists seeking to practice in Arizona, that does not exist for any other licensed dental professional. A.R.S § 32-1201(21) defines a “recognized dental therapy school” as an education program that is accredited by the Commission on Dental Accreditation (CODA). However, CODA did not adopt accreditation standards for dental therapists until 2015. Given this, as an example of this barrier to entry, the University of Minnesota School of Dentistry (UMD) has been training dental therapists since 2009, prior to the adoption of the CODA standards. While developing its accreditation standards, CODA used UMD’s program as a model for the curriculum and training requirements. UMD is in the process of applying for CODA accreditation. However, if this condition remains in the Board rules, licensed dental therapists who have, or will, graduate from UMD prior to CODA accreditation will be barred from seeking licensure by credential in Arizona.

3030 N 3<sup>rd</sup> St. #760  
Phoenix, AZ 85012

[azohc.org](http://azohc.org)  
[azohcoalition@gmail.com](mailto:azohcoalition@gmail.com)



#### Concerning R4-11-1602. Limitation on Number Supervised

A dentist shall not provide direct supervision for more than three dental therapists while the dental therapists are providing services or performing procedures under A.R.S. § 32-1276.03 or R4-11-1601.

Request: Strike R4-11-1602 in its entirety.

Justification: Questionable statutory authority to place restrictions on direct supervision. Limitations on collaborative practice agreements are dealt with in statute but no such language exists relative to direct supervision.

#### Concerning R4-11-1601. Duties and Qualifications [of the dental therapist]

B. A dental therapist may administer Nitrous Oxide Analgesia as authorized by A.R.S. § 32-1276.03(B)(12) if the dental therapist submits proof directly from an issuing institution of completing courses in the administration of Nitrous Oxide Analgesia offered by a recognized dental school, recognized dental therapy school, or recognized dental hygiene school as defined under A.R.S. § 32-1201, that include both theory and supervised practice in the procedures.

C. A dental therapist may perform suturing and suture removal as authorized by A.R.S. § 32-1276.03(B)(21) if the dental therapist submits proof directly from an issuing institution of completing courses in suturing and suture removal offered by a recognized dental school, recognized dental therapy school, or recognized dental hygiene school as defined under A.R.S. § 32-1201, that include both theory and supervised practice in the procedures.

Request: Strike all language of subsections B. and C.

Justification: These rules place an additional regulatory burden on licensees that the agency does not have specific statutory authority to do. Once an applicant obtains a license, they should be free to practice to their full scope UNLESS statute specifies the need to provide additional proof of competency before the full scope can be practiced, as is done in statute for dental hygienists relevant to local anesthesia and nitrous oxide analgesia administration. There is no such requirement in statute for dental therapists. This could be construed as legislating by rule and inconsistent with legislative intent. The Board has recourse if a licensee engages in procedures they are not well qualified to perform and there are complaints or bad outcomes.

#### R4-11-1210. Dental Therapists (New Section)

AZOHC hopes that the Board of Dental Examiners continues to investigate the importance of cultural competency and health disparities courses as essential education for all oral health providers and critical for dental therapists as recognized by the [CODA standards](#) for dental therapists. AZOHC suggests adding

3030 N 3<sup>rd</sup> St. #760  
Phoenix, AZ 85012

[azohc.org](http://azohc.org)  
[azohcoalition@gmail.com](mailto:azohcoalition@gmail.com)



the following section to provide clarity and encourage all dental professionals, including dental therapists, to take advantage of these important courses.

Dental therapists shall complete 54 hours of Recognized Continuing Dental Education in each renewal period as follows:

1. At least 31 Credit Hours in any one or more of the following areas: Dental and medical health, dental therapy services, dental therapy treatment planning, preventive services, dental diagnosis and treatment planning, dental recordkeeping, dental clinical procedures, managing medical emergencies, pain management, dental public health, **cultural competency, health care disparities**, periodontal disease, care of implants, maintenance of cosmetic restorations and sealants, radiology safety and techniques, and courses in corrective and restorative oral health and basic dental sciences, which may include current research, new concepts in dentistry, and behavioral and biological sciences that are oriented to dentistry;

---

The Member Tribes of the Inter Tribal Association of Arizona (ITAA) request reconsideration of the following language in the dental therapy rules under consideration by the Arizona Board of Dental Examiners.

R4-11-16xx (Miscellaneous)

*According to 25 U.S.C. 1616L dental therapists may provide services in Tribal and federal American Indian serving health care programs consistent with A.R.S. § 32-1276 et. seq.*

Background: The Inter Tribal Association of Arizona (ITAA) had recommended language in the rule-making process to the Arizona Board of Dental Examiners that would aid Tribal governments in Arizona implement the dental therapy provisions that pertains to Tribes, Indian Health Service and urban Indian health programs contained in H.B. 2235, adopted into law on May 18, 2018. The Rules Advisory Group, however, did not concur with this request and therefore such language is not included in the final proposed rule before the full board in this oral proceeding. The ITAA seeks your reconsideration of this language so that it is clear to the 22 Tribal Nations in Arizona what elements of the rule apply to Dental Therapy services in Tribal communities.

Justification: ITAA recommends this language in order to clarify A.R.S. § 32-1276 et. seq. specifically A.R.S. § 32-1231. This section of the Arizona statute states that dental therapists employed by IHS, Tribes, and Urban Indian dental clinics do not require state licensure. However, in order for these clinics to conform to the Indian Health Care Improvement Act (IHCA) (25 U.S.C. § 1616l(d)), that authorized dental therapy services in the lower 48 states, Tribes are required to conform to the state's approved scope of practice. The recommended language is needed because the dental therapy rules provide the level of

3030 N 3<sup>rd</sup> St. #760  
Phoenix, AZ 85012

[azohc.org](http://azohc.org)  
[azohcoalition@gmail.com](mailto:azohcoalition@gmail.com)



detail that IHS/Tribal governing boards and dental clinics would rely on as the standard for their clinical practice settings and protocols.

The Arizona Oral Health Coalition looks forward to welcoming trained dental therapists to be licensed in Arizona, as dental therapists can play an integral role in addressing Arizona's longstanding oral health disparities. AZOHC appreciates the work that has been done by the Board and staff throughout the rule-making process and now respectfully requests the inclusion of the recommended changes. AZOHC welcomes the efforts by the Board to move forward with the adoption of the Notices of Proposed Rulemaking (NPRs) for submission to the Governor's Regulatory Review Council (GRRC). Thank you for the opportunity to share our comments.

Sincerely,

The Arizona Oral Health Coalition

3030 N 3<sup>rd</sup> St. #760  
Phoenix, AZ 85012  
[azohc.org](http://azohc.org)  
[azohcoalition@gmail.com](mailto:azohcoalition@gmail.com)

# ARIZONA

STATE BOARD OF DENTAL EXAMINERS



## Statutes & Rules



# TABLE OF CONTENTS

## ARIZONA REVISED STATUTES

### Article 1 – Dental Board

32-1201	Definitions
32-1201.01	Definition of unprofessional conduct
32-1202	Scope of practice; practice of dentistry
32-1203	State board of dental examiners; qualifications of members; terms
32-1204	Removal from office
32-1205	Organization; meetings; quorum; staff
32-1206	Compensation of board members; investigation committee members
32-1207	Powers and duties; executive director; immunity; fees; definition
32-1208	Failure to respond to subpoena; civil penalty
32-1209	Admissibility of records in evidence
32-1210	Annual report
32-1212	Dental board fund
32-1213	Business entities; registration; renewal; civil penalty; exceptions

### Article 2 – Licensing

32-1231	Persons not required to be licensed
32-1232	Qualifications of applicant; application; fee; fingerprint clearance card
32-1233	Applications for licensure; examination requirements
32-1234	Dental consultant license
32-1235	Reinstatement of license or certificate; application for previously denied license or certificate
32-1236	Dentist triennial licensure; continuing education; license reinstatement; license for each place of practice; notice of change of address or place of practice; retired and disabled license status; penalties
32-1237	Restricted permit
32-1238	Issuance of restricted permit
32-1239	Practice under restricted permit
32-1240	Licensure by credential; examinations; waiver; fee
32-1241	Training permits; qualified military health professionals

### Article 3 – Regulation

32-1261	Practicing without license; classification
32-1262	Corporate practice; display of name and license receipt or license; duplicate licenses; fee
32-1263	Grounds for disciplinary action; definition
32-1263.01	Types of disciplinary action; letter of concern; judicial review; notice; removal of notice; violation; classification
32-1263.02	Investigation and adjudication of complaints; disciplinary action; civil penalty; immunity; subpoena authority; definitions
32-1263.03	Investigation committee; complaints; termination; review
32-1264	Maintenance of records
32-1265	Interpretation of chapter
32-1266	Prosecution of violations
32-1267	Use of fraudulent instruments; classification
32-1268	Violations; classification; required proof
32-1269	Violation; classification; injunctive relief
32-1270	Deceased or incapacitated dentists; notification
32-1271	Marking of dentures for identification; retention and release of information

### **Article 3.1 – Licensing and Regulation of Dental Therapists**

32-1276	Definitions
32-1276.01	Application for licensure; requirements; fingerprint clearance card; denial or suspension of application
32-1276.02	Dental therapist triennial licensure; continuing education; license renewal and reinstatement; fees; civil penalties; retired and disabled license status
32-1276.03	Practice of dental therapy; authorized procedures; supervision requirements; restrictions
32-1276.04	Dental therapists; clinical practice; supervising dentists; written collaborative practice agreements
32-1276.05	Dental therapists; supervising dentists; collaborative practice relationships
32-1276.06	Practicing without a license; violation; classification
32-1276.07	Licensure by credential; examination waiver; fee
32-1276.08	Dental therapy schools; credit for prior experience or coursework

### **Article 4 – Licensing and Regulation of Dental Hygienists**

32-1281	Practicing as dental hygienist; supervision requirements; definitions
32-1282	Administration and enforcement
32-1283	Disposition of revenues
32-1284	Qualifications of applicant; application; fee; fingerprint clearance card; rules; denial or suspension of application
32-1285	Applicants for licensure; examination requirements
32-1286	Recognized dental hygiene schools; credit for prior learning
32-1287	Dental hygienist triennial licensure; continuing education; license reinstatement; notice of change of address; penalties; retired and disabled license status
32-1288	Practicing without license; classification
32-1289	Employment of dental hygienist by public agency; institution or school
32-1289.01	Dental hygienists; affiliated practice relationships; rules; definition
32-1290	Grounds for censure; probation; suspension or revocation of license; procedure
32-1291	Dental assistants; regulation; duties
32-1291.01	Expanded function dental assistants; training and examination requirements; duties
32-1292	Restricted permits; suspension; expiration; renewal
32-1292.01	Licensure by credential; examinations; waiver; fee

### **Article 5 – Certification and Regulation of Denturists**

32-1293	Practicing as denturist; denture technology; dental laboratory technician
32-1294	Supervision by dentist; definitions; mouth preparation by dentist; liability; business association
32-1295	Board of dental examiners; additional powers and duties
32-1296	Qualifications of applicant
32-1297.01	Application for certification; fingerprint clearance card; denial; suspension
32-1297.03	Qualification for reexamination
32-1297.04	Fees
32-1297.05	Disposition of revenues
32-1297.06	Denturist certification; continuing education; certificate reinstatement; certificate for each place of practice; notice of change of address or place of practice; penalties
32-1297.07	Discipline; procedure
32-1297.08	Injunction
32-1297.09	Violations; classification

**Article 6 – Dispensing of Drugs and Devices**

32-1298 Dispensing of drugs and devices; conditions; civil penalty; definition

**Article 7 – Rehabilitation**

32-1299 Substance abuse treatment and rehabilitation program; private contract; funding; confidential stipulation agreement

**Article 8 – Mobile Dental Facilities and Portable Dental Units**

32-1299.21 Definitions

32-1299.22 Mobile dental facilities; portable dental units; permits; exceptions

32-1299.23 Permit application; fees; renewal; notification of changes

32-1299.24 Standards of operation and practice

32-1299.25 Informed consent; information for patients

32-1299.26 Disciplinary actions; cessation of operation

# ARIZONA ADMINISTRATIVE CODE (RULES)

## Article 1 – Definitions

R4-11-101	Definitions
R4-11-102	Renumbered
R4-11-103	Renumbered
R4-11-104	Repealed
R4-11-105	Repealed

## Article 2 – Licensure by Credential

R4-11-201	Clinical Examination; Requirements
R4-11-202	Dental Licensure by Credential; Application
R4-11-203	Dental Hygienist Licensure by Credential; Application
R4-11-204	Dental Assistant Radiography Certification by Credential
R4-11-205	Application for Dental Assistant Radiography Certification by Credential
R4-11-206	Repealed
R4-11-207	Repealed
R4-11-208	Repealed
R4-11-209	Repealed
R4-11-210	Repealed
R4-11-211	Repealed
R4-11-212	Repealed
R4-11-213	Repealed
R4-11-214	Repealed
R4-11-215	Repealed
R4-11-216	Repealed

## Article 3 – Examinations, Licensing Qualifications, Application and Renewal, Time-Frames

R4-11-301	Application
R4-11-302	Repealed
R4-11-303	Application Processing Procedures: Issuance, Denial, and Renewal of Dental Licenses, Restricted Permits, Dental Hygiene Licenses, Dental Consultant Licenses, Denturist Certificates, Drug or Device Dispensing Registrations, Business Entity Registration and Mobile Dental Facility and Portable Dental Unit Permits
R4-11-304	Application Processing Procedures: Issuance and Denial of Dental Assistant Certificates Radiography Certification by Credential
R4-11-305	Application Processing Procedures: Issuance, Denial, and Renewal of General Anesthesia and Deep Sedation Permits, Parenteral Sedation Permits, Oral Sedation Permits, and Permit to Employ a Physician Anesthesiologist or Certified Registered Nurse Anesthetist

## Article 4 – Fees

R4-11-401	Retired or Disabled Licensure Renewal Fee
R4-11-402	Business Entity Fees
R4-11-403	Licensing Fees
R4-11-404	Repealed
R4-11-405	Charges for Board Services
R4-11-406	Anesthesia and Sedation Permit Fees
R4-11-407	Renumbered
R4-11-408	Repealed
R4-11-409	Repealed

**Article 5 – Dentists**

R4-11-501	Dentist of Record
R4-11-502	Affiliated Practice
R4-11-504	Renumbered
R4-11-505	Repealed
R4-11-506	Repealed

**Article 6 – Dental Hygienists**

R4-11-601	Duties and Qualifications
R4-11-602	Care of Homebound Patients
R4-11-603	Limitation on Number Supervised
R4-11-604	Selection Committee and Process
R4-11-605	Dental Hygiene Committee
R4-11-606	Candidate Qualifications and Submissions
R4-11-607	Duties of the Dental Hygiene Committee
R4-11-608	Dental Hygiene Consultants
R4-11-609	Affiliated Practice

**Article 7 – Dental Assistants**

R4-11-701	Procedures and Functions Performed by a Dental Assistant under Supervision
R4-11-702	Limitations on Procedures or Functions Performed by a Dental Assistant under Supervision
R4-11-703	Repealed
R4-11-704	Repealed
R4-11-705	Repealed
R4-11-706	Repealed
R4-11-707	Repealed
R4-11-708	Repealed
R4-11-709	Repealed
R4-11-710	Repealed

**Article 8 – Denturists**

R4-11-801	Expired
R4-11-802	Expired
R4-11-803	Renumbered
R4-11-804	Renumbered
R4-11-805	Renumbered
R4-11-806	Renumbered

**Article 9 – Restricted Permits**

R4-11-901	Application for Restricted Permit
R4-11-902	Issuance of a Restricted Permit
R4-11-903	Recognition of a Charitable Dental Clinic Organization
R4-11-904	Determination of Minimum Rate
R4-11-905	Expired
R4-11-906	Expired
R4-11-907	Repealed
R4-11-908	Repealed
R4-11-909	Renumbered

#### **Article 10 – Dental Technicians**

R4-11-1001	Expired
R4-11-1002	Expired
R4-11-1003	Renumbered
R4-11-1004	Renumbered
R4-11-1005	Renumbered
R4-11-1006	Repealed

#### **Article 11 – Advertising**

R4-11-1101	Advertising
R4-11-1102	Advertising as a Recognized Specialist
R4-11-1103	Reserved
R4-11-1104	Repealed
R4-11-1105	Repealed

#### **Article 12 – Continuing Dental Education and Renewal Requirements**

R4-11-1201	Continuing Dental Education
R4-11-1202	Continuing Dental Education Compliance and Renewal Requirements
R4-11-1203	Dentists and Dental Consultants
R4-11-1204	Dental Hygienists
R4-11-1205	Denturists
R4-11-1206	Restricted Permit Holders – Dental
R4-11-1207	Restricted Permit Holders – Dental Hygiene
R4-11-1208	Retired Licensees or Retired Denturists
R4-11-1209	Types of Courses

#### **Article 13 – General Anesthesia and Sedation**

R4-11-1301	General Anesthesia and Deep Sedation
R4-11-1302	Parenteral Sedation
R4-11-1303	Oral Sedation
R4-11-1304	Permit to Employ or Work with a Physician Anesthesiologist or Certified Registered Nurse Anesthetist (CNRA)
R4-11-1305	Reports of Adverse Occurrences
R4-11-1306	Education; Continued Competency
R4-11-1307	Renewal of Permit

#### **Article 14 – Dispensing Drugs and Devices**

R4-11-1401	Prescribing
R4-11-1402	Labeling and Dispensing
R4-11-1403	Storage and Packaging
R4-11-1404	Recordkeeping
R4-11-1405	Compliance
R4-11-1406	Dispensing for Profit Registration and Renewal
R4-11-1407	Renumbered
R4-11-1408	Renumbered
R4-11-1409	Repealed

#### **Article 15 – Complaints, Investigations, Disciplinary Action**

R4-11-1501	Ex-parte Communication
R4-11-1502	Dental Consultant Qualifications
R4-11-1503	Initial Complaint Review
R4-11-1504	Postponement of Interview

**Article 16 – Expired**

R4-11-1601 Expired

**Article 17 – Rehearing or Review**

R4-11-1701 Procedure

**Article 18 – Business Entities**

R4-11-1801 Application

R4-11-1802 Display of Registration

# ARIZONA REVISED STATUTES

## Dentistry – Chapter 11

### Article 1 – Dental Board

#### 32-1201. [Definitions](#)

In this chapter, unless the context otherwise requires:

1. "Affiliated practice dental hygienist" means any licensed dental hygienist who is able, pursuant to section 32-1289.01, to initiate treatment based on the dental hygienist's assessment of a patient's needs according to the terms of a written affiliated practice agreement with a dentist, to treat the patient without the presence of a dentist and to maintain a provider-patient relationship.
2. "Auxiliary personnel" means all dental assistants, dental technicians, dental x-ray technicians and other persons employed by dentists or firms and businesses providing dental services to dentists.
3. "Board" means the state board of dental examiners.
4. "Business entity" means a business organization that has an ownership that includes any persons who are not licensed or certified to provide dental services in this state, that offers to the public professional services regulated by the board and that is established pursuant to the laws of any state or foreign country.
5. "Dental assistant" means any person who acts as an assistant to a dentist, dental therapist or dental hygienist by rendering personal services to a patient that involve close proximity to the patient while the patient is under treatment or observation or undergoing diagnostic procedures.
6. "Dental hygienist" means any person who is licensed and engaged in the general practice of dental hygiene and all related and associated duties, including educational, clinical and therapeutic dental hygiene procedures.
7. "Dental incompetence" means lacking in sufficient dentistry knowledge or skills, or both, in that field of dentistry in which the dentist, dental therapist, denturist or dental hygienist concerned engages, to a degree likely to endanger the health of that person's patients.
8. "Dental laboratory technician" means any person, other than a licensed dentist, who, pursuant to a written work order of a dentist, fabricates artificial teeth, prosthetic appliances or other mechanical and artificial contrivances designed to correct or alleviate injuries or defects, both developmental and acquired, disorders or deficiencies of the human oral cavity, teeth, investing tissues, maxilla or mandible or adjacent associated structures.
9. "Dental therapist" means any person who is licensed and engaged in the general practice of dental therapy and all related and associated duties, including educational, clinical and therapeutic dental therapy procedures.
10. "Dental x-ray laboratory technician" means any person, other than a licensed dentist, who, pursuant to a written work order of a dentist, performs dental and maxillofacial radiography,



including cephalometrics, panoramic and maxillofacial tomography and other dental related nonfluoroscopic diagnostic imaging modalities.

11. "Dentistry", "dentist" and "dental" mean the general practice of dentistry and all specialties or restricted practices of dentistry.
12. "Denturist" means a person practicing denture technology pursuant to article 5 of this chapter.
13. "Disciplinary action" means regulatory sanctions that are imposed by the board in combination with, or as an alternative to, revocation or suspension of a license and that may include:
  - (a) Imposition of an administrative penalty in an amount not to exceed two thousand dollars for each violation of this chapter or rules adopted under this chapter.
  - (b) Imposition of restrictions on the scope of practice.
  - (c) Imposition of peer review and professional education requirements.
  - (d) Imposition of censure or probation requirements best adapted to protect the public welfare, which may include a requirement for restitution to the patient resulting from violations of this chapter or rules adopted under this chapter.
14. "Irregularities in billing" means submitting any claim, bill or government assistance claim to any patient, responsible party or third-party payor for dental services rendered that is materially false with the intent to receive unearned income as evidenced by any of the following:
  - (a) Charges for services not rendered.
  - (b) Any treatment date that does not accurately reflect the date when the service and procedures were actually completed.
  - (c) Any description of a dental service or procedure that does not accurately reflect the actual work completed.
  - (d) Any charge for a service or procedure that cannot be clinically justified or determined to be necessary.
  - (e) Any statement that is material to the claim and that the licensee knows is false or misleading.
  - (f) An abrogation of the copayment provisions of a dental insurance contract by a waiver of all or a part of the copayment from the patient if this results in an excessive or fraudulent charge to a third party or if the waiver is used as an enticement to receive dental services from that provider. This subdivision does not interfere with a contractual relationship between a third-party payor and a licensee or business entity registered with the board.
  - (g) Any other practice in billing that results in excessive or fraudulent charges to the patient.

15. "Letter of concern" means an advisory letter to notify a licensee or a registered business entity that, while the evidence does not warrant disciplinary action, the board believes that the licensee or registered business entity should modify or eliminate certain practices and that continuation of the activities that led to the information being submitted to the board may result in board action against the practitioner's license or the business entity's registration. A letter of concern is not a disciplinary action. A letter of concern is a public document and may be used in a future disciplinary action.
16. "Licensed" means licensed pursuant to this chapter.
17. "Place of practice" means each physical location at which a person who is licensed pursuant to this chapter performs services subject to this chapter.
18. "Primary mailing address" means the address on file with the board and to which official board correspondence, notices or documents are delivered in a manner determined by the board.
19. "Recognized dental hygiene school" means a school that has a dental hygiene program with a minimum two academic year curriculum, or the equivalent of four semesters, and that is approved by the board and accredited by the American dental association commission on dental accreditation.
20. "Recognized dental school" means a dental school that is accredited by the American dental association commission on dental accreditation.
21. "Recognized dental therapy school" means a school that is accredited or that has received initial accreditation by the American dental association commission on dental accreditation.
22. "Recognized denturist school" means a denturist school that maintains standards of entrance, study and graduation and that is accredited by the United States department of education or the council on higher education accreditation.
23. "Supervised personnel" means all dental hygienists, dental assistants, dental laboratory technicians, dental therapists, denturists, dental x-ray laboratory technicians and other persons supervised by licensed dentists.
24. "Teledentistry" means the use of data transmitted through interactive audio, video or data communications for the purposes of examination, diagnosis, treatment planning, consultation and directing the delivery of treatment by dentists and dental providers in settings permissible under this chapter or specified in rules adopted by the board.

### 32-1201.01. Definition of unprofessional conduct

For the purposes of this chapter, "unprofessional conduct" means the following acts, whether occurring in this state or elsewhere:

1. Intentionally betraying a professional confidence or intentionally violating a privileged communication except as either of these may otherwise be required by law. This paragraph does not prevent members of the board from the full and free exchange of information with the licensing and disciplinary boards of other states, territories or districts of the United States or

foreign countries, with the Arizona state dental association or any of its component societies or with the dental societies of other states, counties, districts, territories or foreign countries.

2. Using controlled substances as defined in section 36-2501, narcotic drugs, dangerous drugs or marijuana as defined in section 13-3401, or hypnotic drugs, including acetylurea derivatives, barbituric acid derivatives, chloral, paraldehyde, phenylhydantoin derivatives, sulfonmethane derivatives or any compounds, mixtures or preparations that may be used for producing hypnotic effects, or alcohol to the extent that it affects the ability of the dentist, dental therapist, denturist or dental hygienist to practice that person's profession.
3. Prescribing, dispensing or using drugs for other than accepted dental therapeutic purposes or for other than medically indicated supportive therapy in conjunction with managing a patient's needs and in conjunction with the scope of practice prescribed in section 32-1202.
4. Committing gross malpractice or repeated acts constituting malpractice.
5. Acting or assuming to act as a member of the board if this is not true.
6. Procuring or attempting to procure a certificate of the national board of dental examiners or a license to practice dentistry or dental hygiene by fraud or misrepresentation or by knowingly taking advantage of the mistake of another.
7. Having professional connection with or lending one's name to an illegal practitioner of dentistry or any of the other healing arts.
8. Representing that a manifestly not correctable condition, disease, injury, ailment or infirmity can be permanently corrected, or that a correctable condition, disease, injury, ailment or infirmity can be corrected within a stated time, if this is not true.
9. Offering, undertaking or agreeing to correct, cure or treat a condition, disease, injury, ailment or infirmity by a secret means, method, device or instrumentality.
10. Refusing to divulge to the board, on reasonable notice and demand, the means, method, device or instrumentality used in treating a condition, disease, injury, ailment or infirmity.
11. Dividing a professional fee or offering, providing or receiving any consideration for patient referrals among or between dental care providers or dental care institutions or entities. This paragraph does not prohibit the division of fees among licensees who are engaged in a bona fide employment, partnership, corporate or contractual relationship for the delivery of professional services.
12. Knowingly making any false or fraudulent statement, written or oral, in connection with the practice of dentistry.
13. Having a license refused, revoked or suspended or any other disciplinary action taken against a dentist by, or voluntarily surrendering a license in lieu of disciplinary action to, any other state, territory, district or country, unless the board finds that this action was not taken for reasons that relate to the person's ability to safely and skillfully practice dentistry or to any act of unprofessional conduct.

14. Committing any conduct or practice that constitutes a danger to the health, welfare or safety of the patient or the public.
15. Obtaining a fee by fraud or misrepresentation, or wilfully or intentionally filing a fraudulent claim with a third party for services rendered or to be rendered to a patient.
16. Committing repeated irregularities in billing.
17. Employing unlicensed persons to perform or aiding and abetting unlicensed persons in performing work that can be done legally only by licensed persons.
18. Practicing dentistry under a false or assumed name in this state, other than as allowed by section 32-1262.
19. Wilfully or intentionally causing or allowing supervised personnel or auxiliary personnel operating under the licensee's supervision to commit illegal acts or perform an act or operation other than that allowed under article 4 of this chapter and rules adopted by the board pursuant to section 32-1282.
20. Committing the following advertising practices:
  - (a) Publishing or circulating, directly or indirectly, any false, fraudulent or misleading statements concerning the skill, methods or practices of the licensee or of any other person.
  - (b) Advertising in any manner that tends to deceive or defraud the public.
21. Failing to dispense drugs and devices in compliance with article 6 of this chapter.
22. Failing to comply with a board order, including an order of censure or probation.
23. Failing to comply with a board subpoena in a timely manner.
24. Failing or refusing to maintain adequate patient records.
25. Failing to allow properly authorized board personnel, on demand, to inspect the place of practice and examine and have access to documents, books, reports and records maintained by the licensee or certificate holder that relate to the dental practice or dental-related activity.
26. Refusing to submit to a body fluid examination as required through a monitored treatment program or pursuant to a board investigation into a licensee's or certificate holder's alleged substance abuse.
27. Failing to inform a patient of the type of material the dentist will use in the patient's dental filling and the reason why the dentist is using that particular filling.
28. Failing to report in writing to the board any evidence that a dentist, dental therapist, denturist or dental hygienist is or may be:

- (a) Professionally incompetent.
- (b) Engaging in unprofessional conduct.
- (c) Impaired by drugs or alcohol.
- (d) Mentally or physically unable to safely engage in the activities of a dentist, dental therapist, denturist or dental hygienist pursuant to this chapter.

29. Filing a false report pursuant to paragraph 28 of this section.

30. Practicing dentistry, dental therapy, dental hygiene or denturism in a business entity that is not registered with the board as required by section 32-1213.

31. Dispensing a schedule II controlled substance that is an opioid.

32. Providing services or procedures as a dental therapist that exceed the scope of practice or exceed the services or procedures authorized in the written collaborative practice agreement.

#### 32-1202. Scope of practice; practice of dentistry

For the purposes of this chapter, the practice of dentistry is the diagnosis, surgical or nonsurgical treatment and performance of related adjunctive procedures for any disease, pain, deformity, deficiency, injury or physical condition of the human tooth or teeth, alveolar process, gums, lips, cheek, jaws, oral cavity and associated tissues of the oral maxillofacial facial complex, including removing stains, discolorations and concretions and administering botulinum toxin type A and dermal fillers to the oral maxillofacial complex for therapeutic or cosmetic purposes.

#### 32-1203. State board of dental examiners; qualifications of members; terms

- A. The state board of dental examiners is established consisting of six licensed dentists, two licensed dental hygienists, two public members and one business entity member appointed by the governor for a term of four years, to begin and end on January 1.
- B. Before appointment by the governor, a prospective member of the board shall submit a full set of fingerprints to the governor for the purpose of obtaining a state and federal criminal records check pursuant to section 41-1750 and Public Law 92-544. The department of public safety may exchange this fingerprint data with the federal bureau of investigation.
- C. The business entity member and the public members may participate in all board proceedings and determinations, except in the preparing, giving or grading of examinations for licensure. Dental hygienist board members may participate in all board proceedings and determinations, except in the preparing, giving and grading of examinations that do not relate to dental hygiene procedures.
- D. A board member shall not serve more than two consecutive terms.
- E. For the purposes of this section, business entity member does not include a person who is licensed pursuant to this chapter.

#### 32-1204. Removal from office

The governor may remove a member of the board for persistent neglect of duty, incompetency, unfair, biased, partial or dishonorable conduct, or gross immorality. Conviction of a felony or revocation of the dental license of a member of the board shall ipso facto terminate his membership.

**32-1205. Organization; meetings; quorum; staff**

A. The board shall elect from its membership a president and a vice-president who shall act also as secretary-treasurer.

B. Board meetings shall be conducted pursuant to title 38, chapter 3, article 3.1. A majority of the board constitutes a quorum. Beginning September 1, 2015, meetings held pursuant to this subsection shall be audio recorded and the audio recording shall be posted to the board's website within five business days after the meeting.

C. The board may employ an executive director, subject to title 41, chapter 4, article 4 and legislative appropriation.

D. The board or the executive director may employ personnel, as necessary, subject to title 41, chapter 4, article 4 and legislative appropriation.

**32-1206. Compensation of board members; investigation committee members**

A. Members of the board are entitled to receive compensation in the amount of \$250 for each day actually spent in performing necessary work authorized by the board and all expenses necessarily and properly incurred while performing this work.

B. Members of an investigation committee established by the board may receive compensation in the amount of \$100 for each committee meeting.

**32-1207. Powers and duties; executive director; immunity; fees; definition**

A. The board shall:

1. Adopt rules that are not inconsistent with this chapter for regulating its own conduct, for holding examinations and for regulating the practice of dentists and supervised personnel and registered business entities, provided that:

(a) Regulation of supervised personnel is based on the degree of education and training of the supervised personnel, the state of scientific technology available and the necessary degree of supervision of the supervised personnel by dentists.

(b) Except as provided pursuant to sections 32-1276.03 and 32-1281, only licensed dentists may perform diagnosis and treatment planning, prescribe medication and perform surgical procedures on hard and soft tissues.

(c) Only a licensed dentist, a dental therapist either under the direct supervision of a dentist or pursuant to a written collaborative practice agreement or a dental hygienist in consultation with a dentist may perform examinations, oral health assessments and treatment sequencing for dental hygiene procedures.

2. Adopt a seal.

3. Maintain a record that is available to the board at all times of its acts and proceedings, including the issuance, denial, renewal, suspension or revocation of licenses and the disposition of complaints. The

existence of a pending complaint or investigation shall not be disclosed to the public. Records of complaints shall be available to the public, except only as follows:

(a) If the board dismisses or terminates a complaint, the record of the complaint shall not be available to the public.

(b) If the board has issued a nondisciplinary letter of concern, the record of the complaint shall be available to the public only for a period of five years after the date the board issued the letter of concern.

(c) If the board has required additional nondisciplinary continuing education pursuant to section 32-1263.01 but has not taken further action, the record of the complaint shall be available to the public only for a period of five years after the licensee satisfies this requirement.

(d) If the board has assessed a nondisciplinary civil penalty pursuant to section 32-1208 but has not taken further action, the record of the complaint shall be available to the public only for a period of five years after the licensee satisfies this requirement.

4. Establish a uniform and reasonable standard of minimum educational requirements consistent with the accreditation standards of the American dental association commission on dental accreditation to be observed by dental schools, dental therapy schools and dental hygiene schools in order to be classified as recognized dental schools, dental therapy schools or dental hygiene schools.

5. Establish a uniform and reasonable standard of minimum educational requirements that are consistent with the accreditation standards of the United States department of education or the council on higher education accreditation and that must be observed by denture technology schools in order to be classified as recognized denture technology schools.

6. Determine the reputability and classification of dental schools, dental therapy schools, dental hygiene schools and denture technology schools in accordance with their compliance with the standard set forth in paragraph 4 or 5 of this subsection, whichever is applicable.

7. Issue licenses to persons who the board determines are eligible for licensure pursuant to this chapter.

8. Determine the eligibility of applicants for restricted permits and issue restricted permits to those found eligible.

9. Pursuant to section 32-1263.02, investigate charges of misconduct on the part of licensees and persons to whom restricted permits have been issued.

10. Issue a letter of concern, which is not a disciplinary action but refers to practices that may lead to a violation and to disciplinary action.

11. Issue decrees of censure, fix periods and terms of probation, suspend or revoke licenses, certificates and restricted permits, as the facts may warrant, and reinstate licenses, certificates and restricted permits in proper cases.

12. Collect and disburse monies.

13. Perform all other duties that are necessary to enforce this chapter and that are not specifically or by necessary implication delegated to another person.

14. Establish criteria for the renewal of permits issued pursuant to board rules relating to general anesthesia and sedation.

B. The board may:

1. Sue and be sued.

2. Issue subpoenas, including subpoenas to the custodian of patient records, compel attendance of witnesses, administer oaths and take testimony concerning all matters within the board's jurisdiction. If a person refuses to obey a subpoena issued by the board, the refusal shall be certified to the superior court and proceedings shall be instituted for contempt of court.

3. Adopt rules:

(a) Prescribing requirements for continuing education for renewal of all licenses issued pursuant to this chapter.

(b) Prescribing educational and experience prerequisites for administering intravenous or intramuscular drugs for the purpose of sedation or for using general anesthetics in conjunction with a dental treatment procedure.

(c) Prescribing requirements for obtaining licenses for retired licensees or licensees who have a disability, including the triennial license renewal fee.

4. Hire consultants to assist the board in the performance of its duties and employ persons to provide investigative, professional and clerical assistance as the board deems necessary.

5. Contract with other state or federal agencies as required to carry out the purposes of this chapter.

6. If determined by the board, order physical, psychological, psychiatric and competency evaluations of licensed dentists, dental therapists and dental hygienists, certified denturists and applicants for licensure and certification at the expense of those individuals.

7. Establish an investigation committee consisting of not more than eleven licensees who are in good standing, who are appointed by the board and who serve at the pleasure of the board to investigate any complaint submitted to the board, initiated by the board or delegated by the board to the investigation committee pursuant to this chapter.

C. The executive director or the executive director's designee may:

1. Issue and renew licenses, certificates and permits to applicants who meet the requirements of this chapter.

2. Initiate an investigation if evidence appears to demonstrate that a dentist, dental therapist, dental hygienist, denturist or restricted permit holder may be engaged in unprofessional conduct or may be unable to safely practice dentistry.



3. Initiate an investigation if evidence appears to demonstrate that a business entity may be engaged in unethical conduct.

4. Subject to board approval, enter into a consent agreement with a dentist, dental therapist, denturist, dental hygienist or restricted permit holder if there is evidence of unprofessional conduct.

5. Subject to board approval, enter into a consent agreement with a business entity if there is evidence of unethical conduct.

6. Refer cases to the board for a formal interview.

7. If delegated by the board, enter into a stipulation agreement with a person under the board's jurisdiction for the treatment, rehabilitation and monitoring of chemical substance abuse or misuse.

D. Members of the board are personally immune from liability with respect to all acts done and actions taken in good faith and within the scope of their authority.

E. The board by rule shall require that a licensee obtain a permit for applying general anesthesia, semiconscious sedation or conscious sedation, shall establish and collect a fee of not more than \$300 to cover administrative costs connected with issuing the permit and shall conduct inspections to ensure compliance.

F. The board by rule may establish and collect fees for license verification, board meeting agendas and minutes, published lists and mailing labels.

G. This section does not prohibit the board from conducting its authorized duties in a public meeting.

H. For the purposes of this section:

1. "Good standing" means that a person holds an unrestricted and unencumbered license that has not been suspended or revoked pursuant to this chapter.

2. "Record of complaint" means the document reflecting the final disposition of a complaint or investigation.

#### **32-1208. Failure to respond to subpoena; civil penalty**

In addition to any disciplinary action authorized by statute, the board may assess a nondisciplinary civil penalty in an amount not to exceed five hundred dollars for a licensee who fails to respond to a subpoena issued by the board pursuant to this chapter.

#### **32-1209. Admissibility of records in evidence**

A copy of any part of the recorded proceedings of the board certified by the executive director, or a certificate by the executive director that any asserted or purported record, name, license number, restricted permit number or action is not entered in the recorded proceedings of the board, may be admitted as evidence in any court in this state. A person making application and paying a fee set by the board may procure from the executive director a certified copy of any portion of the records of the board unless these records are classified as confidential as provided by law. Unless otherwise provided by law, all records concerning an investigation, examination materials, records of

examination grading and applicants' performance and transcripts of educational institutions concerning applicants are confidential and are not public records. "Records of applicants' performance" does not include records of whether an applicant passed or failed an examination.

### 32-1210. Annual report

A. Not later than October 1 of each year, the board shall make an annual written report to the governor for the preceding year that includes the following information:

1. The number of licensed dentists in the state.
2. The number of licenses issued during the preceding year and to whom issued.
3. The number of examinations held and the dates of the examinations.
4. The facts with respect to accusations filed with the board, of hearings held in connection with those accusations and the results of those hearings.
5. The facts with respect to prosecution of persons charged with violations of this chapter.
6. A full and complete statement of financial transactions of the board.
7. Any other matters that the board wishes to include in the report or that the governor requires.

B. On request of the governor the board shall submit a supplemental report.

### 32-1212. Dental board fund

A. Except as provided in subsection C of this section, pursuant to sections 35-146 and 35-147, the executive director of the board shall each month deposit ten per cent of all fees, fines and other revenue received by the board, in the state general fund and deposit the remaining ninety per cent in the dental board fund.

B. Monies deposited in the dental board fund shall be subject to the provisions of section 35-143.01.

C. Monies from administrative penalties received pursuant to section 32-1263.01 shall be deposited, pursuant to sections 35-146 and 35-147, in the state general fund.

### 32-1213. Business entities; registration; renewal; civil penalty; exceptions

A. A business entity may not offer dental services pursuant to this chapter unless:

1. The entity is registered with the board pursuant to this section.
2. The services are conducted by a licensee pursuant to this chapter.

B. The business entity must file a registration application on a form provided by the board. The application must include:

1. A description of the entity's services offered to the public.
  2. The name of any dentist who is authorized to provide and who is responsible for providing the dental services offered at each office.
  3. The names and addresses of the officers and directors of the business entity.
  4. A registration fee prescribed by the board in rule.
- C. A business entity must file a separate registration application and pay a fee for each branch office in this state.
- D. A registration expires three years after the date the board issues the registration. A business entity that wishes to renew a registration must submit an application for renewal as prescribed by the board on a triennial basis on a form provided by the board before the expiration date. An entity that fails to renew the registration before the expiration date is subject to a late fee as prescribed by the board by rule. The board may stagger the dates for renewal applications.
- E. The business entity must notify the board in writing within thirty days after any change:
1. In the entity's name, address or telephone number.
  2. In the officers or directors of the business entity.
  3. In the name of any dentist who is authorized to provide and who is responsible for providing the dental services in any facility.
- F. The business entity shall establish a written protocol for the secure storage, transfer and access of the dental records of the business entity's patients. This protocol must include, at a minimum, procedures for:
1. Notifying patients of the future locations of their records if the business entity terminates or sells the practice.
  2. Disposing of unclaimed dental records.
  3. The timely response to requests by patients for copies of their records.
- G. The business entity must notify the board within thirty days after the dissolution of any registered business entity or the closing or relocation of any facility and must disclose to the board the entity's procedure by which its patients may obtain their records.
- H. The board may do any of the following pursuant to its disciplinary procedures if an entity violates the board's statutes or rules:
1. Refuse to issue a registration.
  2. Suspend or revoke a registration.

3. Impose a civil penalty of not more than \$2,000 for each violation.
  4. Enter a decree of censure.
  5. Issue an order prescribing a period and terms of probation that are best adapted to protect the public welfare and that may include a requirement for restitution to a patient for a violation of this chapter or rules adopted pursuant to this chapter.
  6. Issue a letter of concern if a business entity's actions may cause the board to take disciplinary action.
- I. The board shall deposit, pursuant to sections 35-146 and 35-147, civil penalties collected pursuant to this section in the state general fund.
- J. This section does not apply to:
1. A sole proprietorship or partnership that consists exclusively of dentists who are licensed pursuant to this chapter.
  2. Any of the following entities licensed under title 20:
    - (a) A service corporation.
    - (b) An insurer authorized to transact disability insurance.
    - (c) A prepaid dental plan organization that does not provide directly for prepaid dental services.
    - (d) A health care services organization that does not provide directly for dental services.
  3. A professional corporation or professional limited liability company, the shares of which are exclusively owned by dentists who are licensed pursuant to this chapter and that is formed to engage in the practice of dentistry pursuant to title 10, chapter 20 or title 29 relating to professional limited liability companies.
  4. A facility regulated by the federal government or a state, district or territory of the United States.
  5. An administrator or executor of the estate of a deceased dentist or a person who is legally authorized to act for a dentist who has been adjudicated to be mentally incompetent for not more than one year after the date the board receives notice of the dentist's death or incapacitation pursuant to section 32-1270.
- K. A facility that offers dental services to the public by persons licensed under this chapter shall be registered by the board unless the facility is any of the following:
1. Owned by a dentist who is licensed pursuant to this chapter.
  2. Regulated by the federal government or a state, district or territory of the United States.

L. Except for issues relating to insurance coding and billing that require the name, signature and license number of the dentist providing treatment, this section does not:

1. Authorize a licensee in the course of providing dental services for an entity registered pursuant to this section to disregard or interfere with a policy or practice established by the entity for the operation and management of the business.

2. Authorize an entity registered pursuant to this section to establish or enforce a business policy or practice that may interfere with the clinical judgment of the licensee in providing dental services for the entity or may compromise a licensee's ability to comply with this chapter.

M. The board shall adopt rules that provide a method for the board to receive the assistance and advice of business entities licensed pursuant to this chapter in all matters relating to the regulation of business entities.

N. An individual currently holding a surrendered or revoked license to practice dentistry or dental hygiene in any state or jurisdiction in the United States may not have a majority ownership interest in the business entity registered pursuant to this section. Revocation and surrender of licensure shall be limited to disciplinary actions resulting in loss of license or surrender of license instead of disciplinary action. Dentists or dental hygienists affected by this subsection shall have one year after the surrender or revocation to divest themselves of their ownership interest. This subsection does not apply to publicly held companies. For the purposes of this subsection, "majority ownership interest" means an ownership interest greater than fifty percent.

## **Article 2 – Licensure**

### **32-1231. Persons not required to be licensed**

This chapter does not prohibit:

1. A dentist, dental therapist or dental hygienist who is officially employed in the service of the United States from practicing dentistry in the dentist's, dental therapist's or dental hygienist's official capacity, within the scope of that person's authority, on persons who are enlisted in, directly connected with or under the immediate control of some branch of service of the United States.

2. A person, whether or not licensed by this state, from practicing dental therapy either:

(a) In the discharge of official duties on behalf of the United States government, including the United States department of veterans affairs, the United States public health service and the Indian health service.

(b) While employed by tribal health programs authorized pursuant to Public Law 93-638 or urban Indian health programs.

3. An intern or student of dentistry, dental therapy or dental hygiene from operating in the clinical departments or laboratories of a recognized dental school, dental therapy school, dental hygiene school or hospital under the supervision of a dentist.

4. An unlicensed person from performing for a licensed dentist merely mechanical work on inert matter not within the oral cavity in the construction, making, alteration or repairing of any artificial dental substitute or any dental restorative or corrective appliance, if the casts or impressions for that work

have been furnished by a licensed dentist and the work is directly supervised by the dentist for whom done or under a written authorization signed by the dentist, but the burden of proving that written authorization or direct supervision is on the person charged with having violated this provision.

5. A clinician who is not licensed in this state from giving demonstrations, before bona fide dental societies, study clubs and groups of professional students, that are free to the persons on whom made.

6. The state director of dental public health from performing the director's administrative duties as prescribed by law.

7. A dentist or dental hygienist to whom a restricted permit has been issued from practicing dentistry or dental hygiene in this state as provided in sections 32-1237 and 32-1292.

8. A dentist, dental therapist or dental hygienist from practicing for educational purposes on behalf of a recognized dental school, recognized dental therapy school or recognized dental hygiene school.

**32-1232. Qualifications of applicant; application; fee; fingerprint clearance card**

A. An applicant for licensure shall meet the requirements of section 32-1233 and shall hold a diploma conferring a degree of doctor of dental medicine or doctor of dental surgery from a recognized dental school.

B. Each candidate shall submit a written application to the board accompanied by a nonrefundable Arizona dental jurisprudence examination fee of \$300. The board shall waive this fee for candidates who are holders of valid restricted permits. Each candidate shall also obtain a valid fingerprint clearance card issued pursuant to section 41-1758.03.

C. The board may deny an application for a license, for license renewal or for a restricted permit if the applicant:

1. Has committed any act that would be cause for censure, probation or suspension or revocation of a license under this chapter.

2. While unlicensed, committed or aided and abetted the commission of any act for which a license is required by this chapter.

3. Knowingly made any false statement in the application.

4. Has had a license to practice dentistry revoked by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

5. Is currently under suspension or restriction by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

6. Has surrendered, relinquished or given up a license to practice dentistry in lieu of disciplinary action by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

D. The board shall suspend an application for a license, for license renewal or for a restricted permit if the applicant is currently under investigation by a dental regulatory board in another jurisdiction. The board shall not issue or deny a license to the applicant until the investigation is resolved.

**32-1233. Applicants for licensure; examination requirements**

An applicant for licensure shall have passed all of the following:

1. The written national dental board examinations.
2. A clinical examination administered by a state or regional testing agency in the United States within five years preceding filing the application.
3. The Arizona dental jurisprudence examination.

**32-1234. Dental consultant license**

A. A person may apply for a dental consultant license if the applicant demonstrates to the board's satisfaction that the applicant:

1. Has continuously held a license to practice dentistry for at least twenty-five years issued by one or more states or territories of the United States or the District of Columbia but is not currently licensed to practice dentistry in Arizona.
2. Has not had a license to practice dentistry revoked by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.
3. Is not currently under suspension or restriction by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.
4. Has not surrendered, relinquished or given up a license to practice dentistry in lieu of disciplinary action by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.
5. Meets the applicable requirements of section 32-1232.
6. Meets the requirements of section 32-1233, paragraph 1. If an applicant has taken a state written theory examination instead of the written national dental board examinations, the applicant must provide the board with official documentation of passing the written theory examinations in the state where the applicant holds a current license. The board shall then determine the applicant's eligibility for a license pursuant to this section.
7. Meets the application requirements as prescribed in rule by the board.

B. The board shall suspend an application for a dental consultant license if the applicant is currently under investigation by a dental regulatory board in another jurisdiction in the United States. The board shall not issue or deny a license to the applicant until the investigation is resolved.

C. A person to whom a dental consultant license is issued shall practice dentistry only in the course of the person's employment or on behalf of an entity licensed under title 20 with the practice limited to supervising or conducting utilization review or other claims or case management activity on behalf of the entity licensed pursuant to title 20. A person who holds a dental consultant license is prohibited from providing direct patient care.

D. This section does not require a person to apply for or hold a dental consultant license in order for that person to serve as a consultant to or engage in claims review activity for an entity licensed pursuant to title 20.

E. Except as provided in subsection B of this section, a dental consultant licensee is subject to all of the provisions of this chapter that are applicable to licensed dentists.

### **32-1235. Reinstatement of license or certificate; application for previously denied license or certificate**

A. On written application the board may issue a new license or certificate to a dentist, dental therapist, dental hygienist or denturist whose license or certificate was previously suspended or revoked by the board or surrendered by the applicant if the applicant demonstrates to the board's satisfaction that the applicant is completely rehabilitated with respect to the conduct that was the basis for the suspension, revocation or surrender. In making its decision, the board shall determine:

1. That the applicant has not engaged in any conduct during the suspension, revocation or surrender period that would have constituted a basis for revocation pursuant to section 32-1263.

2. If a criminal conviction was a basis for the suspension, revocation or surrender, that the applicant's civil rights have been fully restored pursuant to statute or any other applicable recognized judicial or gubernatorial order.

3. That the applicant has made restitution to any aggrieved person as ordered by a court of competent jurisdiction.

4. That the applicant demonstrates any other standard of rehabilitation the board determines is appropriate.

B. Except as provided in subsection C of this section, a person may not submit an application for reinstatement less than five years after the date of suspension, revocation or surrender.

C. The board shall vacate its previous order to suspend or revoke a license or certificate if that suspension or revocation was based on a conviction of a felony or an offense involving moral turpitude and that conviction has been reversed on appeal. The person may submit an application for reinstatement as soon as the court enters the reversal.

D. An applicant for reinstatement must comply with all initial licensing or certification requirements prescribed by this chapter.

E. A person whose application for a license or certificate has been denied for failure to meet academic requirements may apply for licensure or certification not less than two years after the denial.

F. A person whose application for a license has been denied pursuant to section 32-1232, subsection C may apply for licensure not less than five years after the denial.



32-1236. Dentist triennial licensure; continuing education; license reinstatement; license for each place of practice; notice of change of address or place of practice; retired and disabled license status; penalties

A. Except as provided in section 32-4301, a license expires thirty days after the licensee's birth month every third year. On or before the last day of the licensee's birth month every third year, every licensed dentist shall submit to the board a complete renewal application and pay a license renewal fee of not more than \$650, established by a formal vote of the board. At least once every three years, before establishing the fee, the board shall review the amount of the fee in a public meeting. Any change in the amount of the fee shall be applied prospectively to a licensee at the time of licensure renewal. The fee prescribed by this subsection does not apply to a retired dentist or to a dentist with a disability.

B. A licensee shall include a written affidavit with the renewal application that affirms that the licensee complies with board rules relating to continuing education requirements. A licensee is not required to complete the written affidavit if the licensee received an initial license within the year immediately preceding the expiration date of the license or the licensee is in disabled status. If the licensee is not in compliance with board rules relating to continuing education, the board may grant an extension of time to complete these requirements if the licensee includes a written request for an extension with the renewal application instead of the written affidavit and the renewal application is received on or before the last day of the licensee's birth month of the expiration year. The board shall consider the extension request based on criteria prescribed by the board by rule. If the board denies an extension request, the license expires thirty days after the licensee's birth month.

C. A person applying for licensure for the first time in this state shall pay a prorated fee for the period remaining until the licensee's next birth month. This fee shall not exceed one-third of the fee established pursuant to subsection A of this section. Subsequent licensure renewal shall be conducted pursuant to this section.

D. An expired license may be reinstated by submitting a complete renewal application within the twenty-four-month period immediately following the expiration of the license with payment of the renewal fee and a \$100 penalty. Whenever issued, reinstatement is as of the date of application and entitles the applicant to licensure only for the remainder of the applicable three-year period. If a person does not reinstate a license pursuant to this subsection, the person must reapply for licensure pursuant to this chapter.

E. Each licensee must provide to the board in writing both of the following:

1. A primary mailing address.
2. The address for each place of practice.

F. A licensee maintaining more than one place of practice shall obtain from the board a duplicate license for each office. A fee set by the board shall be charged for each duplicate license. The licensee shall notify the board in writing within ten days after opening the additional place or places of practice. The board shall impose a penalty of \$50 for failure to notify the board.

G. A licensee who is fully retired and a licensee who has a permanent disability may contribute services to a recognized charitable institution and still retain that classification for triennial registration purposes on payment of a reduced renewal fee as prescribed by the board by rule.

H. A licensee applying for retired or disabled status shall:

1. Relinquish any prescribing privileges and shall attest by affidavit that the licensee has surrendered to the United States drug enforcement administration any registration issued pursuant to the federal controlled substances act and has surrendered to the board any registration issued pursuant to section 36-2606.

2. If the licensee holds a permit to dispense drugs and devices pursuant to section 32-1298, surrender that permit to the board.

3. Attest by affidavit that the licensee is not currently engaged in the practice of dentistry.

I. A licensee who changes the licensee's primary mailing address or place of practice address shall notify the board of that change in writing within ten days. The board shall impose a penalty of \$50 if a licensee fails to notify the board of the change within that time. The board shall increase the penalty imposed to \$100 if a licensee fails to notify it of the change within thirty days.

### 32-1237. Restricted permit

A person may apply for a restricted permit if the applicant demonstrates to the board's satisfaction that the applicant:

1. Has a pending contract with a recognized charitable dental clinic or organization that offers dental services without compensation or at a rate that only reimburses the clinic for dental supplies and overhead costs and the applicant will receive no compensation for dental services provided at the clinic or organization.

2. Has a license to practice dentistry issued by another state or territory of the United States or the District of Columbia.

3. Has been actively engaged in one or more of the following for three years immediately preceding the application:

(a) The practice of dentistry.

(b) An approved dental residency training program.

(c) Postgraduate training deemed by the board equivalent to an approved dental residency training program.

4. Is competent and proficient to practice dentistry.

5. Meets the requirements of section 32-1232, subsection A, other than the requirement to meet section 32-1233.

### 32-1238. Issuance of restricted permit

A restricted permit may be issued by the board without examination or payment of fee for a period not to exceed one year or until June 30th, whichever is lesser, and shall automatically expire at that time. The board may, in its discretion and pursuant to rules or regulations not inconsistent with this chapter, renew such restricted permit for periods not to exceed one year.

### 32-1239. Practice under restricted permit

A person to whom a restricted permit is issued shall be entitled to practice dentistry only in the course of his employment by a recognized charitable dental clinic or organization as approved by the board, on the following conditions:

1. He shall file a copy of his employment contract with the board and such contract shall contain the following provisions:

(a) That applicant understands and acknowledges that if his employment by the charitable dental clinic or organization is terminated prior to the expiration of his restricted permit, his restricted permit will be automatically revoked and he will voluntarily surrender the permit to the board and will no longer be eligible to practice unless or until he has satisfied the requirements of section 32-1237 or has successfully passed the examination as provided in this article.

(b) He shall be employed by a dental clinic or organization organized and operated for charitable purposes offering dental services without compensation. The term "employed" as used in this subdivision shall include the performance of dental services without compensation.

(c) He shall be subject to all the provisions of this chapter applicable to licensed dentists.

### 32-1240. Licensure by credential; examinations; waiver; fee

A. The board by rule may waive the examination requirements of this article on receipt of evidence satisfactory to the board that the applicant has passed the clinical examination of another state or testing agency more than five years before submitting an application for licensure pursuant to this chapter and the other state or testing agency maintains a standard of licensure that is substantially equivalent to that of this state as determined by the board. The board by rule shall require:

1. A minimum number of active practice hours within a specific time period before the applicant submits the application. The board shall define what constitutes active practice.

2. An affirmation that the applicant has completed the continuing education requirements of the jurisdiction where the applicant is licensed.

B. The applicant shall pay a licensure by credential fee of not more than two thousand dollars as prescribed by the board.

### 32-1241. Training permits; qualified military health professionals

A. The board shall issue a training permit to a qualified military health professional who is practicing dentistry in the United States armed forces and who is discharging the health professional's official duties by participating in a clinical training program based at a civilian hospital affiliated with the United States department of defense.

B. Before the board issues the training permit, the qualified military health professional must submit a written statement from the United States department of defense that the applicant:

1. Is a member of the United States armed forces who is performing duties for and at the direction of the United States department of defense at a location in this state approved by the United States department of defense.

2. Has a current license or is credentialed to practice dentistry in a jurisdiction of the United States.

3. Meets all required qualification standards prescribed pursuant to 10 United States Code section 1094(d) relating to the licensure requirements for health professionals.

4. Has not had a license to practice revoked by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction that constitutes unprofessional conduct pursuant to this chapter.

5. Is not currently under investigation, suspension or restriction by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction that constitutes unprofessional conduct pursuant to this chapter.

6. Has not surrendered, relinquished or given up a license in lieu of disciplinary action by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction that constitutes unprofessional conduct pursuant to this chapter. This paragraph does not prevent the board from considering the request for a training permit of a qualified military health professional who surrendered, relinquished or gave up a license in lieu of disciplinary action by a regulatory board in another jurisdiction if that regulatory board subsequently reinstated the qualified military health professional's license.

C. The qualified military health professional may not open an office or designate a place to meet patients or receive calls relating to the practice of dentistry in this state outside of the facilities and programs of the approved civilian hospital.

D. The qualified military health professional may not practice outside of the professional's scope of practice.

E. A training permit issued pursuant to this section is valid for one year. The qualified military health professional may apply annually to the board to renew the permit. With each application to renew the qualified military health professional must submit a written statement from the United States department of defense asking the board for continuation of the training permit.

F. The board may not impose a fee to issue or renew a training permit to a qualified military health professional pursuant to this section.

## **Article 3 – Regulation**

### **32-1261. Practicing without license; classification**

Except as otherwise provided a person is guilty of a class 6 felony who, without a valid license or business entity registration as prescribed by this chapter:

1. Practices dentistry or any branch of dentistry as described in section 32-1202.

2. In any manner or by any means, direct or indirect, advertises, represents or claims to be engaged or ready and willing to engage in that practice as described in section 32-1202.

3. Manages, maintains or carries on, in any capacity or by any arrangement, a practice, business, office or institution for the practice of dentistry, or that is advertised, represented or held out to the public for that purpose.

**32-1262. Corporate practice; display of name and license receipt or license; duplicate licenses; fee**

A. It is lawful to practice dentistry as a professional corporation or professional limited liability company.

B. It is lawful to practice dentistry as a business organization if the business organization is registered as a business entity pursuant to this chapter.

C. It is lawful to practice dentistry under a name other than that of the licensed practitioners if the name is not deceptive or misleading.

D. If practicing as a professional corporation or professional limited liability company, the name and address of record of the dentist owners of the practice shall be conspicuously displayed at the entrance to each owned location.

E. If practicing as a business organization that is registered as a business entity pursuant to section 32-1213, the receipt for the current registration period must be conspicuously displayed at the entrance to each place of practice.

F. A licensee's receipt for the current licensure period shall be displayed in the licensee's place of practice in a manner that is always readily observable by patients or visitors and shall be exhibited to members of the board or to duly authorized agents of the board on request. The receipt for the licensure period immediately preceding shall be kept on display until replaced by the receipt for the current period. During the year in which the licensee is first licensed and until the receipt for the following period is received, the license shall be displayed in lieu of the receipt.

G. If a dentist maintains more than one place of practice, the board may issue one or more duplicate licenses or receipts on payment of a fee fixed by the board not exceeding twenty-five dollars for each duplicate.

H. If a licensee legally changes the licensee's name from that in which the license was originally issued, the board, on satisfactory proof of the change and surrender of the original license, if obtainable, may issue a new license in the new name and shall charge the established fee for duplicate licenses.

**32-1263. Grounds for disciplinary action; definition**

A. The board may invoke disciplinary action against any person who is licensed under this chapter for any of the following reasons:

1. Unprofessional conduct as defined in section 32-1201.01.

2. Conviction of a felony or of a misdemeanor involving moral turpitude, in which case the record of conviction or a certified copy is conclusive evidence.

3. Physical or mental incompetence to practice pursuant to this chapter.

4. Committing or aiding, directly or indirectly, a violation of or noncompliance with any provision of this chapter or of any rules adopted by the board pursuant to this chapter.

5. Dental incompetence as defined in section 32-1201.

B. This section does not establish a cause of action against a licensee or a registered business entity that makes a report of unprofessional conduct or unethical conduct in good faith.

C. The board may take disciplinary action against a business entity that is registered pursuant to this chapter for unethical conduct.

D. For the purposes of this section, "unethical conduct" means the following acts occurring in this state or elsewhere:

1. Failing to report in writing to the board any evidence that a dentist, dental therapist, denturist or dental hygienist is or may be professionally incompetent, is or may be guilty of unprofessional conduct, is or may be impaired by drugs or alcohol or is or may be mentally or physically unable to safely engage in the permissible activities of a dentist, dental therapist, denturist or dental hygienist.

2. Falsely reporting to the board that a dentist, dental therapist, denturist or dental hygienist is or may be guilty of unprofessional conduct, is or may be impaired by drugs or alcohol or is or may be mentally or physically unable to safely engage in the permissible activities of a dentist, dental therapist, denturist or dental hygienist.

3. Obtaining or attempting to obtain a registration or registration renewal by fraud or by misrepresentation.

4. Knowingly filing with the board any application, renewal or other document that contains false information.

5. Failing to register or failing to submit a renewal registration with the board pursuant to section 32-1213.

6. Failing to provide the following persons with access to any place for which a registration has been issued or for which an application for a registration has been submitted in order to conduct a site investigation, inspection or audit:

(a) The board or its employees or agents.

(b) An authorized federal or state official.

7. Failing to notify the board of a change in officers and directors, a change of address or a change in the dentists providing services pursuant to section 32-1213, subsection E.

8. Failing to provide patient records pursuant to section 32-1264.

9. Obtaining a fee by fraud or misrepresentation or wilfully or intentionally filing a fraudulent claim with a third party for services rendered or to be rendered to a patient.

10. Engaging in repeated irregularities in billing.

11. Engaging in the following advertising practices:

(a) Publishing or circulating, directly or indirectly, any false or fraudulent or misleading statements concerning the skill, methods or practices of a registered business entity, a licensee or any other person.

(b) Advertising in any manner that tends to deceive or defraud the public.

12. Failing to comply with a board subpoena in a timely manner.

13. Failing to comply with a final board order, including a decree of censure, a period or term of probation, a consent agreement or a stipulation.

14. Employing or aiding and abetting unlicensed persons to perform work that must be done by a person licensed pursuant to this chapter.

15. Engaging in any conduct or practice that constitutes a danger to the health, welfare or safety of the patient or the public.

16. Engaging in a policy or practice that interferes with the clinical judgment of a licensee providing dental services for a business entity or compromising a licensee's ability to comply with this chapter.

17. Engaging in a practice by which a dental hygienist, dental therapist or dental assistant exceeds the scope of practice or restrictions included in a written collaborative practice agreement.

32-1263.01. Types of disciplinary action; letter of concern; judicial review; notice; removal of notice; violation; classification

A. The board may take any one or a combination of the following disciplinary actions against any person licensed under this chapter:

1. Revocation of license to practice.

2. Suspension of license to practice.

3. Entering a decree of censure, which may require that restitution be made to an aggrieved party.

4. Issuance of an order fixing a period and terms of probation best adapted to protect the public health and safety and to rehabilitate the licensed person. The order fixing a period and terms of probation may require that restitution be made to the aggrieved party.

5. Imposition of an administrative penalty in an amount not to exceed two thousand dollars for each violation of this chapter or rules adopted under this chapter.

6. Imposition of a requirement for restitution of fees to the aggrieved party.

7. Imposition of restrictions on the scope of practice.

8. Imposition of peer review and professional education requirements.

9. Imposition of community service.

B. The board may issue a letter of concern if a licensee's continuing practices may cause the board to take disciplinary action. The board may also issue a nondisciplinary order requiring the licensee to complete a prescribed number of hours of continuing education in an area or areas prescribed by the board to provide the licensee with the necessary understanding of current developments, skills, procedures or treatment.

C. Failure to comply with any order of the board, including an order of censure or probation, is cause for suspension or revocation of a license.

D. All disciplinary and final nondisciplinary actions or orders, not including letters of concern or advisory letters, issued by the board against a licensee or certificate holder shall be posted to that licensee's or certificate holder's profile on the board's website. For the purposes of this subsection, only final nondisciplinary actions and orders that are issued after January 1, 2018 shall be posted.

E. Except as provided in section 41-1092.08, subsection H, final decisions of the board are subject to judicial review pursuant to title 12, chapter 7, article 6.

F. If the state board of dental examiners acts to modify any dentist's prescription-writing privileges, it shall immediately notify the Arizona state board of pharmacy of the modification.

G. The board may post a notice of its suspension or revocation of a license at the licensee's place of business. This notice shall remain posted for sixty days. A person who removes this notice without board or court authority before that time is guilty of a class 3 misdemeanor.

H. A licensee or certificate holder shall respond in writing to the board within twenty days after a notice of hearing is served. A licensee who fails to answer the charges in a complaint and notice of hearing issued pursuant to this article and title 41, chapter 6, article 10 is deemed to admit the acts charged in the complaint, and the board may revoke or suspend the license without a hearing.

[32-1263.02. Investigation and adjudication of complaints; disciplinary action; civil penalty; immunity; subpoena authority; definitions](#)

A. The board on its own motion, or the investigation committee if established by the board, may investigate any evidence that appears to show the existence of any of the causes or grounds for disciplinary action as provided in section 32-1263. The board or investigation committee may investigate any complaint that alleges the existence of any of the causes or grounds for disciplinary action as provided in section 32-1263. The board shall not act on its own motion or on a complaint received by the board if the allegation of unprofessional conduct, unethical conduct or any other violation of this chapter against a licensee occurred more than four years before the complaint is received by the board. The four-year time limitation does not apply to:

1. Medical malpractice settlements or judgments, allegations of sexual misconduct or an incident or occurrence that involved a felony, diversion of a controlled substance or impairment while practicing by the licensee.



2. The board's consideration of the specific unprofessional conduct related to the licensee's failure to disclose conduct or a violation as required by law.

B. At the request of the complainant, the board or investigation committee shall not disclose to the respondent the complainant name unless the information is essential to proceedings conducted pursuant to this article.

C. The board or investigation committee shall conduct necessary investigations, including interviews between representatives of the board or investigation committee and the licensee with respect to any information obtained by or filed with the board under subsection A of this section or obtained by the board or investigation committee during the course of an investigation. The results of the investigation conducted by the investigation committee, including any recommendations from the investigation committee for disciplinary action against any licensee, shall be forwarded to the board for its review.

D. The board or investigation committee may designate one or more persons of appropriate competence to assist the board or investigation committee with any aspect of an investigation.

E. If, based on the information the board receives under subsection A or C of this section, the board finds that the public health, safety or welfare imperatively requires emergency action and incorporates a finding to that effect in its order, the board may order a summary suspension of a licensee's license pursuant to section 41-1092.11 pending proceedings for revocation or other action.

F. If a complaint refers to quality of care, the patient may be referred for a clinical evaluation at the discretion of the board or the investigation committee.

G. If, after completing its investigation or review pursuant to this section, the board finds that the information provided pursuant to subsection A or C of this section is insufficient to merit disciplinary action against a licensee, the board may take any of the following actions:

1. Dismiss the complaint.

2. Issue a nondisciplinary letter of concern to the licensee.

3. Issue a nondisciplinary order requiring the licensee to complete a prescribed number of hours of continuing education in an area or areas prescribed by the board to provide the licensee with the necessary understanding of current developments, skills, procedures or treatment.

4. Assess a nondisciplinary civil penalty in an amount not to exceed \$500 if the complaint involves the licensee's failure to respond to a board subpoena.

H. If, after completing its investigation or review pursuant to this section, the board finds that the information provided pursuant to subsection A or C of this section is sufficient to merit disciplinary action against a licensee, the board may request that the licensee participate in a formal interview before the board. If the licensee refuses or accepts the invitation for a formal interview and the results indicate that grounds may exist for revocation or suspension, the board shall issue a formal complaint and order that a hearing be held pursuant to title 41, chapter 6, article 10. If, after completing a formal interview, the board finds that the protection of the public requires emergency action, it may order a summary suspension of the license pursuant to section 41-1092.11 pending formal revocation proceedings or other action authorized by this section.

I. If, after completing a formal interview, the board finds that the information provided under subsection A or C of this section is insufficient to merit suspension or revocation of the license, it may take any of the following actions:

1. Dismiss the complaint.
2. Order disciplinary action pursuant to section 32-1263.01, subsection A.
3. Enter into a consent agreement with the licensee for disciplinary action.
4. Order nondisciplinary continuing education pursuant to section 32-1263.01, subsection B.
5. Issue a nondisciplinary letter of concern to the licensee.

J. A copy of the board's order issued pursuant to this section shall be given to the complainant and to the licensee. Pursuant to title 41, chapter 6, article 10, the licensee may petition for rehearing or review.

K. Any person who in good faith makes a report or complaint as provided in this section to the board or to any person or committee acting on behalf of the board is not subject to liability for civil damages as a result of the report.

L. The board, through its president or the president's designee, may issue subpoenas to compel the attendance of witnesses and the production of documents and may administer oaths, take testimony and receive exhibits in evidence in connection with an investigation initiated by the board or a complaint filed with the board. In case of disobedience to a subpoena, the board may invoke the aid of any court of this state in requiring the attendance and testimony of witnesses and the production of documentary evidence.

M. Patient records, including clinical records, medical reports, laboratory statements and reports, files, films, reports or oral statements relating to diagnostic findings or treatment of patients, any information from which a patient or a patient's family may be identified or information received and records kept by the board as a result of the investigation procedures taken pursuant to this chapter, are not available to the public.

N. The board may charge the costs of formal hearings conducted pursuant to title 41, chapter 6, article 10 to a licensee it finds to be in violation of this chapter.

O. The board may accept the surrender of an active license from a licensee who is subject to a board investigation and who admits in writing to any of the following:

1. Being unable to safely engage in the practice of dentistry.
2. Having committed an act of unprofessional conduct.
3. Having violated this chapter or a board rule.

P. In determining the appropriate disciplinary action under this section, the board may consider any previous nondisciplinary and disciplinary actions against a licensee.

Q. If a licensee who is currently providing dental services for a registered business entity believes that the registered business entity has engaged in unethical conduct as defined pursuant to section 32-1263, subsection D, paragraph 16, the licensee must do both of the following before filing a complaint with the board:

1. Notify the registered business entity in writing that the licensee believes that the registered business entity has engaged in a policy or practice that interferes with the clinical judgment of the licensee or that compromises the licensee's ability to comply with the requirements of this chapter. The licensee shall specify in the notice the reasons for this belief.

2. Provide the registered business entity with at least ten calendar days to respond in writing to the assertions made pursuant to paragraph 1 of this subsection.

R. A licensee who files a complaint pursuant to subsection Q of this section shall provide the board with a copy of the licensee's notification and the registered business entity's response, if any.

S. A registered business entity may not take any adverse employment action against a licensee because the licensee complies with the requirements of subsection Q of this section.

T. For the purposes of this section:

1. "License" includes a certificate issued pursuant to this chapter.

2. "Licensee" means a dentist, dental therapist, dental hygienist, denturist, dental consultant, restricted permit holder or business entity regulated pursuant to this chapter.

### **32-1263.03. Investigation committee; complaints; termination; review**

A. If established by the board, the investigation committee may terminate a complaint if the investigation committee's review indicates that the complaint is without merit and that termination is appropriate.

B. The investigation committee may not terminate a complaint if a court has entered a medical malpractice judgment against a licensee.

C. At each regularly scheduled board meeting, the investigation committee shall provide to the board a list of each complaint the investigation committee terminated pursuant to subsection A of this section since the preceding board meeting. On review, the board shall approve, modify or reject the investigation committee's action.

D. A person who is aggrieved by an action taken by the investigation committee pursuant to subsection A of this section may file a written request that the board review that action. The request must be filed within thirty days after that person is notified of the investigation committee's action by personal delivery or, if the notification is mailed to that person's last known residence or place of business, within thirty-five days after the date on the notification. At the next regular board meeting, the board shall review the investigation committee's action. On review, the board shall approve, modify or reject the investigation committee's action.

32-1264. Maintenance of records

A. A person who is licensed or certified pursuant to this chapter shall make and maintain legible written records concerning all diagnoses, evaluations and treatments of each patient of record. A licensee or certificate holder shall maintain records that are stored or produced electronically in retrievable paper form. These records shall include:

1. All treatment notes, including current health history and clinical examinations.
2. Prescription and dispensing information, including all drugs, medicaments and dental materials used for patient care.
3. Diagnosis and treatment planning.
4. Dental and periodontal charting. Specialist charting must include areas of requested care and notation of visual oral examination describing any areas of potential pathology or radiographic irregularities.
5. All radiographs.

B. Records are available for review and for treatment purposes to the dentist, dental therapist, dental hygienist or denturist providing care.

C. On request, the licensee or certificate holder shall allow properly authorized board personnel to have access to the licensee's or certificate holder's place of practice to conduct an inspection and must make the licensee's or certificate holder's records, books and documents available to the board free of charge as part of an investigation process.

D. Within fifteen business days after a patient's written request, that patient's dentist, dental therapist, dental hygienist or denturist or a registered business entity shall transfer legible and diagnostic quality copies of that patient's records to another licensee or certificate holder or that patient. The patient may be charged for the reasonable costs of copying and forwarding these records. A dentist, dental therapist, dental hygienist, denturist or registered business entity may require that payment of reproduction costs be made in advance, unless the records are necessary for continuity of care, in which case the records shall not be withheld. Copies of records shall not be withheld because of an unpaid balance for dental services.

E. Unless otherwise required by law, a person who is licensed or certified pursuant to this chapter or a business entity that is registered pursuant to this chapter must retain the original or a copy of a patient's dental records as follows:

1. If the patient is an adult, for at least six years after the last date the adult patient received dental services from that provider.
2. If the patient is a child, for at least three years after the child's eighteenth birthday or for at least six years after the last date the child received dental services from the provider, whichever occurs later.

### 32-1265. Interpretation of chapter

Nothing in this chapter shall be construed to abridge a license issued under laws of this state relating to medicine or surgery.

### 32-1266. Prosecution of violations

The attorney general shall act for the board in all matters requiring legal assistance, but the board may employ other or additional counsel in its own behalf. The board shall assist prosecuting officers in enforcement of this chapter, and in so doing may engage suitable persons to assist in investigations and in the procurement and presentation of evidence. Subpoenas or other orders issued by the board may be served by any officer empowered to serve processes, who shall receive the fees prescribed by law. Expenditures made in carrying out provisions of this section shall be paid from the dental board fund.

### 32-1267. Use of fraudulent instruments; classification

A person is guilty of a class 5 felony who:

1. Knowingly presents to or files with the board as his own a diploma, degree, license, certificate or identification belonging to another, or which is forged or fraudulent.
2. Exhibits or displays any instrument described in paragraph 1 with intent that it be used as evidence of the right of such person to practice dentistry in this state.
3. With fraudulent intent alters any instrument described in paragraph 1 or uses or attempts to use it when so altered.
4. Sells, transfers or offers to sell or transfer, or who purchases, procures or offers to purchase or procure a diploma, license, certificate or identification, with intent that it be used as evidence of the right to practice dentistry in this state by a person other than the one to whom it belongs or is issued.

### 32-1268. Violations; classification; required proof

A. A person is guilty of a class 2 misdemeanor who:

1. Employs, contracts with, or by any means procures the assistance of, or association with, for the purpose of practicing dentistry, a person not having a valid license therefor.
2. Fails to obey a summons or other order regularly and properly issued by the board.
3. Violates any provision of this chapter for which the penalty is not specifically prescribed.

B. In a prosecution or hearing under this chapter, it is necessary to prove only a single act of violation and not a general course of conduct, and where the violation is continued over a period of one or more days each day constitutes a separate violation subject to the penalties prescribed in this chapter.

**32-1269. Violation; classification; injunctive relief**

A. A person convicted under this chapter is guilty of a class 2 misdemeanor unless another classification is specifically prescribed in this chapter. Violations shall be prosecuted by the county attorney and tried before the superior court in the county in which the violation occurs.

B. In addition to penalties provided in this chapter, the courts of the state are vested with jurisdiction to prevent and restrain violations of this chapter as nuisances per se, and the county attorneys shall, and the board may, institute proceedings in equity to prevent and restrain violations. A person damaged, or threatened with loss or injury, by reason of a violation of this chapter is entitled to obtain injunctive relief in any court of competent jurisdiction against any damage or threatened loss or injury by reason of a violation of this chapter.

**32-1270. Deceased or incapacitated dentists; notification**

A. An administrator or executor of the estate of a deceased dentist, or a person who is legally authorized to act for a dentist who has been adjudicated to be mentally incompetent, must notify the board within sixty days after the dentist's death or incapacitation. The administrator or executor may employ a licensed dentist for a period of not more than one year to:

1. Continue the deceased or incapacitated dentist's practice.
2. Conclude the affairs of the deceased or incapacitated dentist, including the sale of any assets.

B. An administrator or executor operating a practice pursuant to this section for more than one year must register as a business entity pursuant to section 32-1213.

**32-1271. Marking of dentures for identification; retention and release of information**

A. Every complete upper or lower denture fabricated by a licensed dentist, or fabricated pursuant to the dentist's work order, must be marked with the patient's name unless the patient objects. The marking must be done during fabrication and must be permanent, legible and cosmetically acceptable. The dentist or the dental laboratory shall determine the location of the marking and the methods used to implant or apply it. The dentist must inform the patient that the marking is used only to identify the patient, and the patient may choose which marking is to appear on the dentures.

B. The dentist must retain the records of marked dentures and may not release the records to any person except to law enforcement officers in any emergency that requires personal identification by means of dental records or to anyone authorized by the patient to receive this information.

## **Article 3.1 – Licensing and Regulation of Dental Therapists**

**32-1276. Definitions**

In this article, unless the context otherwise requires:

1. "Applicant" means a person who is applying for licensure to practice dental therapy in this state.
2. "Direct supervision" means that a licensed dentist is present in the office and available to provide treatment or care to a patient and observe a dental therapist's work.
3. "Licensee" means a person who holds a license to practice dental therapy in this state.

32-1276.01. Application for licensure; requirements; fingerprint clearance card; denial or suspension of application

A. An applicant for licensure as a dental therapist in this state shall do all of the following:

1. Apply to the board on a form prescribed by the board.
2. Verify under oath that all statements in the application are true to the applicant's knowledge.

3. Enclose with the application:

- (a) A recent photograph of the applicant.
- (b) The application fee established by the board by rule.

B. The board may grant a license to practice dental therapy to an applicant who meets all of the following requirements:

1. Is licensed as a dental hygienist pursuant to article 4 of this chapter.
2. Graduates from a dental therapy education program that is accredited by or holds an initial accreditation from the American dental association commission on dental accreditation and that is offered through an accredited higher education institution recognized by the United States department of education.
3. Successfully passes, both of the following:
  - (a) Within five years before filing the application, a clinical examination in dental therapy administered by a state or testing agency in the United States.
  - (b) The Arizona dental jurisprudence examination.
4. Is not subject to any grounds for denial of the application under this chapter.
5. Obtains a valid fingerprint clearance card issued pursuant to title 41, chapter 12, article 3.1.
6. Meets all requirements for licensure established by the board by rule.

C. The board may deny an application for licensure or license renewal if the applicant:

1. Has committed an act that would be cause for censure, probation or suspension or revocation of a license under this chapter.
2. While unlicensed, committed or aided and abetted the commission of an act for which a license is required by this chapter.
3. Knowingly made any false statement in the application.

4. Has had a license to practice dental therapy revoked by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

5. Is currently suspended or restricted by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

6. Has surrendered, relinquished or given up a license to practice dental therapy instead of having disciplinary action taken against the applicant by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

D. The board shall suspend an application for licensure if the applicant is currently under investigation by a dental regulatory board in another jurisdiction. The board shall not issue a license or deny an application for licensure until the investigation is completed.

32-1276.02. Dental therapist triennial licensure; continuing education; license renewal and reinstatement; fees; civil penalties; retired and disabled license status

A. Except as provided in section 32-4301, a license issued under this article expires thirty days after the licensee's birth month every third year. On or before the last day of the licensee's birth month every third year, each licensed dental therapist shall submit to the board a complete renewal application and pay a license renewal fee established by a formal vote of the board. At least once every three years, before establishing the fee, the board shall review the amount of the fee in a public meeting. Any change in the amount of the fee shall be applied prospectively to a licensee at the time of licensure renewal. The fee prescribed by this subsection does not apply to a retired dental therapist or to a dental therapist with a disability.

B. A licensee shall include a written affidavit with the renewal application that affirms that the licensee complies with board rules relating to continuing education requirements. A licensee is not required to complete the written affidavit if the licensee received an initial license within the year immediately preceding the expiration date of the license or the licensee is in disabled status. If the licensee is not in compliance with board rules relating to continuing education, the board may grant an extension of time to complete these requirements if the licensee includes a written request for an extension with the renewal application instead of the written affidavit and the renewal application is received on or before the last day of the licensee's birth month of the expiration year. The board shall consider the extension request based on criteria prescribed by the board by rule. If the board denies an extension request, the license expires thirty days after the licensee's birth month of the expiration year.

C. An applicant for a dental therapy license for the first time in this state shall pay a prorated fee for the period remaining until the licensee's next birthday. This fee may not exceed one-third of the fee prescribed pursuant to subsection A of this section. Subsequent applications shall be conducted pursuant to this section.

D. An expired license may be reinstated by submitting a complete renewal application within the twenty-four-month period immediately following the expiration of the license with payment of the renewal fee and a \$100 penalty. When the license is issued, reinstatement is as of the date of application and entitles the applicant to licensure only for the remainder of the applicable three-year period. If a person does not reinstate a license pursuant to this subsection, the person must reapply for licensure pursuant to this article.



E. A licensee shall notify the board in writing within ten days after the licensee changes the primary mailing address listed with the board. The board shall impose a civil penalty of \$50 if a licensee fails to notify the board of the change within that time. The board shall increase the civil penalty to \$100 if a licensee fails to notify the board of the change within thirty days.

F. A licensee who is at least sixty-five years of age and who is fully retired and a licensee who has a permanent disability may contribute services to a recognized charitable institution and still retain that classification for triennial registration purposes by paying a reduced renewal fee as prescribed by the board by rule.

G. A licensee is not required to maintain a dental hygienist license.

**32-1276.03. Practice of dental therapy; authorized procedures; supervision requirements; restrictions**

A. A person is deemed to be a practicing dental therapist if the person does any of the acts or performs any operations included in the general practice of dental therapists or dental therapy or any related and associated duties.

B. Either under the direct supervision of a dentist or pursuant to a written collaborative practice agreement, a licensed dental therapist may do any of the following:

1. Perform oral evaluations and assessments of dental disease and formulate individualized treatment plans.
2. Perform comprehensive charting of the oral cavity.
3. Provide oral health instruction and disease prevention education, including motivational interviewing, nutritional counseling and dietary analysis.
4. Expose and process dental radiographic images.
5. Perform dental prophylaxis, scaling, root planing and polishing procedures.
6. Dispense and administer oral and topical nonnarcotic analgesics and anti-inflammatory and antibiotic medications as prescribed by a licensed health care provider.
7. Apply topical preventive and prophylactic agents, including fluoride varnishes, antimicrobial agents, silver diamine fluoride and pit and fissure sealants.
8. Perform pulp vitality testing.
9. Apply desensitizing medicaments or resins.
10. Fabricate athletic mouth guards and soft occlusal guards.
11. Change periodontal dressings.
12. Administer nitrous oxide analgesics and local anesthetics.

13. Perform simple extraction of erupted primary teeth.
14. Perform nonsurgical extractions of periodontally diseased permanent teeth that exhibit plus three or grade three mobility and that are not impacted, fractured, unerupted or in need of sectioning for removal.
15. Perform emergency palliative treatments of dental pain that is related to care or a service described in this section.
16. Prepare and place direct restorations in primary and permanent teeth.
17. Fabricate and place single-tooth temporary crowns.
18. Prepare and place preformed crowns on primary teeth.
19. Perform indirect and direct pulp capping on permanent teeth.
20. Perform indirect pulp capping on primary teeth.
21. Perform suturing and suture removal.
22. Provide minor adjustments and repairs on removable prostheses.
23. Place and remove space maintainers.
24. Perform all functions of a dental assistant and expanded function dental assistant.
25. Perform other related services and functions that are authorized by the supervising dentist within the dental therapist's scope of practice and for which the dental therapist is trained.
26. Provide referrals.
27. Perform any other duties of a dental therapist that are authorized by the board by rule.

C. A dental therapist may not:

1. Dispense or administer a narcotic drug.
2. Independently bill for services to any individual or third-party payor.

D. A person may not claim to be a dental therapist unless that person is licensed as a dental therapist under this article.

[32-1276.04. Dental therapists; clinical practice; supervising dentists; written collaborative practice agreements](#)

A. A dental therapist may practice only in the following practice settings or locations, including mobile dental units, that are operated or served by any of the following:

1. A federally qualified community health center.
2. A health center program that has received a federal look-alike designation.
3. A community health center.
4. A nonprofit dental practice or a nonprofit organization that provides dental care to low-income and underserved individuals.
5. A private dental practice that provides dental care for community health center patients of record who are referred by the community health center.

B. A dental therapist may practice in this state either under the direct supervision of a dentist or pursuant to a written collaborative practice agreement. Before a dental therapist may enter into a written collaborative practice agreement, the dental therapist shall complete one thousand hours of dental therapy clinical practice under the direct supervision of a dentist who is licensed in this state and shall provide documentation satisfactory to the board of having completed this requirement.

C. A practicing dentist who holds an active license pursuant to this chapter and a licensed dental therapist who holds an active license pursuant to this article may enter into a written collaborative practice agreement for the delivery of dental therapy services. The supervising dentist shall provide or arrange for another dentist or specialist to provide any service needed by the dental therapist's patient that exceeds the dental therapist's authorized scope of practice.

D. A dentist may not enter into more than four separate written collaborative practice agreements for the delivery of dental therapy services.

E. A written collaborative practice agreement between a dentist and a dental therapist shall do all of the following:

1. Address any limit on services and procedures to be performed by the dental therapist, including types of populations and any age-specific or procedure-specific practice protocol, including case selection criteria, assessment guidelines and imaging frequency.
2. Address any limit on practice settings established by the supervising dentist and the level of supervision required for various services or treatment settings.
3. Establish practice protocols, including protocols for informed consent, recordkeeping, managing medical emergencies and providing care to patients with complex medical conditions, including requirements for consultation before initiating care.
4. Establish protocols for quality assurance, administering and dispensing medications and supervising dental assistants.
5. Include specific protocols to govern situations in which the dental therapist encounters a patient requiring treatment that exceeds the dental therapist's authorized scope of practice or the limits imposed by the collaborative practice agreement.
6. Specify that the extraction of permanent teeth may be performed only under the direct supervision of a dentist and consistent with section 32-1276.03, subsection B, paragraph 14.

F. Except as provided in section 32-1276.03, subsection B, paragraph 14, to the extent authorized by the supervising dentist in the written collaborative practice agreement, a dental therapist may practice dental therapy procedures authorized under this article in a practice setting in which the supervising dentist is not on-site and has not previously examined the patient or rendered a diagnosis.

G. The written collaborative practice agreement must be signed and maintained by both the supervising dentist and the dental therapist and may be updated and amended as necessary by both the supervising dentist and dental therapist. The supervising dentist and dental therapist shall submit a copy of the agreement and any amendment to the agreement to the board.

#### 32-1276.05. Dental therapists; supervising dentists; collaborative practice relationships

A. A dentist who holds an active license pursuant to this chapter and a dental therapist who holds an active license pursuant to this article may enter into a collaborative practice relationship through a written collaborative practice agreement for the delivery of dental therapy services.

B. Each dental practice shall disclose to a patient whether the patient is scheduled to see the dentist or dental therapist.

C. Each dentist in a collaborative practice relationship shall:

1. Be available to provide appropriate contact, communication and consultation with the dental therapist.

2. Adopt procedures to provide timely referral of patients whom the dental therapist refers to a licensed dentist for examination. The dentist to whom the patient is referred shall be geographically available to see the patient.

D. Each dental therapist in a collaborative practice relationship shall:

1. Perform only those duties within the terms of the written collaborative practice agreement.

2. Maintain an appropriate level of contact with the supervising dentist.

E. The dental therapist and the supervising dentist shall notify the board of the beginning of the collaborative practice relationship and provide the board with a copy of the written collaborative practice agreement and any amendments to the agreement within thirty days after the effective date of the agreement or amendment. The dental therapist and supervising dentist shall also notify the board within thirty days after the termination date of the written collaborative practice agreement if the date is different than the termination date provided in the agreement.

F. Subject to the terms of the written collaborative practice agreement, a dental therapist may perform all dental therapy procedures authorized in section 32-1276.03. The dentist's presence, examination, diagnosis and treatment plan are not required unless specified by the written collaborative practice agreement.

#### 32-1276.06. Practicing without a license; violation; classification

It is a class 6 felony for a person to practice dental therapy in this state unless the person has obtained a license from the board as provided in this article.

[32-1276.07. Licensure by credential; examination waiver; fee](#)

A. The board by rule may waive the examination requirements of this article on receipt of evidence satisfactory to the board that the applicant has passed the clinical examination of another state or testing agency more than five years before submitting the application for licensure pursuant to this article and the other state or testing agency maintains a standard of licensure or certification that is substantially equivalent to that of this state as determined by the board. The board by rule shall require:

1. A minimum number of active practice hours within a specific time period before the applicant submits the application. The board shall prescribe what constitutes active practice.
2. An affirmation that the applicant has completed the continuing education requirements of the jurisdiction where the applicant is licensed or certified.

B. The applicant shall pay a licensure by credential fee as established by the board in rule.

C. An applicant under this section is not required to obtain a dental hygienist license in this state if the board determines that the applicant otherwise meets the requirements for dental therapist licensure.

[32-1276.08. Dental therapy schools; credit for prior experience or coursework](#)

Notwithstanding any other law, a recognized dental therapy school may grant advanced standing or credit for prior learning to a student who has prior experience or has completed coursework that the school determines is equivalent to didactic and clinical education in its accredited program.

## **Article 4 – Licensing and Regulation of Dental Hygienists**

[32-1281. Practicing as dental hygienist; supervision requirements; definitions](#)

A. A person is deemed to be practicing as a dental hygienist if the person does any of the acts or performs any of the operations included in the general practice of dental hygienists, dental hygiene and all related and associated duties.

B. A licensed dental hygienist may perform the following:

1. Prophylaxis.
2. Scaling.
3. Closed subgingival curettage.
4. Root planing.
5. Administering local anesthetics and nitrous oxide.
6. Inspecting the oral cavity and surrounding structures for the purposes of gathering clinical data to facilitate a diagnosis.
7. Periodontal screening or assessment.

8. Recording clinical findings.
  9. Compiling case histories.
  10. Exposing and processing dental radiographs.
  11. All functions authorized and deemed appropriate for dental assistants.
  12. Except as provided in paragraph 13 of this subsection, those restorative functions permissible for an expanded function dental assistant if qualified pursuant to section 32-1291.01.
  13. Placing interim therapeutic restorations after successfully completing a course at an institution accredited by the commission on dental accreditation of the American dental association.
- C. The board by rule shall prescribe the circumstances under which a licensed dental hygienist may:
1. Apply preventive and therapeutic agents to the hard and soft tissues.
  2. Use emerging scientific technology and prescribe the necessary training, experience and supervision to operate newly developed scientific technology. A dentist who supervises a dental hygienist whose duties include the use of emerging scientific technology must have training on using the emerging technology that is equal to or greater than the training the dental hygienist is required to obtain.
  3. Perform other procedures not specifically authorized by this section.
- D. Except as provided in subsections E, F and I of this section, a dental hygienist shall practice under the general supervision of a dentist who is licensed pursuant to this chapter.
- E. A dental hygienist may practice under the general supervision of a physician who is licensed pursuant to chapter 13 or 17 of this title in an inpatient hospital setting.
- F. A dental hygienist may perform the following procedures on meeting the following criteria and under the following conditions:
1. Administering local anesthetics under the direct supervision of a dentist who is licensed pursuant to this chapter after:
    - (a) The dental hygienist successfully completes a course in administering local anesthetics that includes didactic and clinical components in both block and infiltration techniques offered by a dental or dental hygiene program accredited by the commission on dental accreditation of the American dental association.
    - (b) The dental hygienist successfully completes an examination in local anesthesia given by the western regional examining board or a written and clinical examination of another state or regional examination that is substantially equivalent to the requirements of this state, as determined by the board.

(c) The board issues to the dental hygienist a local anesthesia certificate on receipt of proof that the requirements of subdivisions (a) and (b) of this paragraph have been met.

2. Administering local anesthetics under general supervision to a patient of record if all of the following are true:

(a) The dental hygienist holds a local anesthesia certificate issued by the board.

(b) The patient is at least eighteen years of age.

(c) The patient has been examined by a dentist who is licensed pursuant to this chapter within the previous twelve months.

(d) There has been no change in the patient's medical history since the last examination. If there has been a change in the patient's medical history within that time, the dental hygienist must consult with the dentist before administering local anesthetics.

(e) The supervising dentist who performed the examination has approved the patient for being administered local anesthetics by the dental hygienist under general supervision and has documented this approval in the patient's record.

3. Administering nitrous oxide analgesia under the direct supervision of a dentist who is licensed pursuant to this chapter after:

(a) The dental hygienist successfully completes a course in administering nitrous oxide analgesia that includes didactic and clinical components offered by a dental or dental hygiene program accredited by the commission on dental accreditation of the American dental association.

(b) The board issues to the dental hygienist a nitrous oxide analgesia certificate on receipt of proof that the requirements of subdivision (a) of this paragraph have been met.

G. The board may issue local anesthesia and nitrous oxide analgesia certificates to a licensed dental hygienist on receipt of evidence satisfactory to the board that the dental hygienist holds a valid certificate or credential in good standing in the respective procedure issued by a licensing board of another jurisdiction of the United States.

H. A dental hygienist may perform dental hygiene procedures in the following settings:

1. On a patient of record of a dentist within that dentist's office.

2. Except as prescribed in section 32-1289.01, in a health care facility, long-term care facility, public health agency or institution, public or private school or homebound setting on patients who have been examined by a dentist within the previous year.

3. In an inpatient hospital setting pursuant to subsection E of this section.

I. A dental hygienist may provide dental hygiene services under an affiliated practice relationship with a dentist as prescribed in section 32-1289.01.

J. For the purposes of this article:

1. "Assessment" means a limited, clinical inspection that is performed to identify possible signs of oral or systemic disease, malformation or injury and the potential need for referral for diagnosis and treatment, and may include collecting clinical information to facilitate an examination, diagnosis and treatment plan by a dentist.

2. "Direct supervision" means that the dentist is present in the office while the dental hygienist is treating a patient and is available for consultation regarding procedures that the dentist authorizes and for which the dentist is responsible.

3. "General supervision" means:

(a) That the dentist is available for consultation, whether or not the dentist is in the dentist's office, over procedures that the dentist has authorized and for which the dentist remains responsible.

(b) With respect to an inpatient hospital setting, that a physician who is licensed pursuant to chapter 13 or 17 of this title is available for consultation, whether or not the physician is physically present at the hospital.

4. "Interim therapeutic restoration" means a provisional restoration that is placed to stabilize a primary or permanent tooth and that consists of removing soft material from the tooth using only hand instrumentation, without using rotary instrumentation, and subsequently placing an adhesive restorative material.

5. "Screening" means determining an individual's need to be seen by a dentist for diagnosis and does not include an examination, diagnosis or treatment planning.

#### 32-1282. Administration and enforcement

A. So far as applicable, the board shall have the same powers and duties in administering and enforcing this article that it has under section 32-1207 in administering and enforcing articles 1, 2 and 3 of this chapter.

B. The board shall adopt rules that provide a method for the board to receive the assistance and advice of dental hygienists licensed pursuant to this chapter in all matters relating to the regulation of dental hygienists.

#### 32-1283. Disposition of revenues

The provisions of section 32-1212 shall apply to all fees, fines and other revenues received by the board under this article.

#### 32-1284. Qualifications of applicant; application; fee; fingerprint clearance card; rules; denial or suspension of application

A. An applicant for licensure as a dental hygienist shall be at least eighteen years of age, shall meet the requirements of section 32-1285 and shall present to the board evidence of graduation or a certificate of satisfactory completion in a course or curriculum in dental hygiene from a recognized dental hygiene school. A candidate shall make written application to the board accompanied by a



nonrefundable Arizona dental jurisprudence examination fee of \$100. The board shall waive this fee for candidates who are holders of valid restricted permits. Each candidate shall also obtain a valid fingerprint clearance card issued pursuant to section 41-1758.03.

B. The board shall adopt rules that govern the practice of dental hygienists and that are not inconsistent with this chapter.

C. The board may deny an application for licensure or an application for license renewal if the applicant:

1. Has committed an act that would be cause for censure, probation or suspension or revocation of a license under this chapter.

2. While unlicensed, committed or aided and abetted the commission of an act for which a license is required by this chapter.

3. Knowingly made any false statement in the application.

4. Has had a license to practice dental hygiene revoked by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

5. Is currently under suspension or restriction by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

6. Has surrendered, relinquished or given up a license to practice dental hygiene instead of disciplinary action by a regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

D. The board shall suspend an application for a license if the applicant is currently under investigation by a dental regulatory board in another jurisdiction. The board shall not issue or deny a license to the applicant until the investigation is resolved.

### **32-1285. Applicants for licensure; examination requirements**

An applicant for licensure shall have passed all of the following:

1. The national dental hygiene board examination.

2. A clinical examination administered by a state or regional testing agency in the United States within five years preceding filing the application.

3. The Arizona dental jurisprudence examination.

32-1286. Recognized dental hygiene schools; credit for prior learning

Notwithstanding any law to the contrary, a recognized dental hygiene school may grant advanced standing or credit for prior learning to a student who has prior experience or course work that the school determines is equivalent to didactic and clinical education in its accredited program.

32-1287. Dental hygienist triennial licensure; continuing education; license reinstatement; notice of change of address; penalties; retired and disabled license status

A. Except as provided in section 32-4301, a license expires thirty days after the licensee's birth month every third year. On or before the last day of the licensee's birth month every third year, every licensed dental hygienist shall submit to the board a complete renewal application and pay a license renewal fee of not more than \$325, established by a formal vote of the board. At least once every three years, before establishing the fee, the board shall review the amount of the fee in a public meeting. Any change in the amount of the fee shall be applied prospectively to a licensee at the time of licensure renewal. The fee prescribed by this section does not apply to a retired hygienist or a hygienist with a disability.

B. A licensee shall include a written affidavit with the renewal application that affirms that the licensee complies with board rules relating to continuing education requirements. A licensee is not required to complete the written affidavit if the licensee received an initial license within the year immediately preceding the expiration date of the license or the licensee is in disabled status. If the licensee is not in compliance with board rules relating to continuing education, the board may grant an extension of time to complete these requirements if the licensee includes a written request for an extension with the renewal application instead of the written affidavit and the renewal application is received on or before the last day of the licensee's birth month of the expiration year. The board shall consider the extension request based on criteria prescribed by the board by rule. If the board denies an extension request, the license expires thirty days after the licensee's birth month of the expiration year.

C. A person applying for a license for the first time in this state shall pay a prorated fee for the period remaining until the licensee's next birth month. This fee shall not exceed one-third of the fee established pursuant to subsection A of this section. Subsequent registrations shall be conducted pursuant to this section.

D. An expired license may be reinstated by submitting a complete renewal application within the twenty-four-month period immediately following the expiration of the license with payment of the renewal fee and a \$100 penalty. Whenever issued, reinstatement is as of the date of application and entitles the applicant to licensure only for the remainder of the applicable three-year period. If a person does not reinstate a license pursuant to this subsection, the person must reapply for licensure pursuant to this chapter.

E. A licensee shall notify the board in writing within ten days after the licensee changes the primary mailing address listed with the board. The board shall impose a penalty of \$50 if a licensee fails to notify the board of the change within that time. The board shall increase the penalty imposed to \$100 if a licensee fails to notify it of the change within thirty days.

F. A licensee who is over sixty-five years of age and who is fully retired and a licensee who has a permanent disability may contribute services to a recognized charitable institution and still retain that classification for triennial registration purposes on payment of a reduced renewal fee as prescribed by the board by rule.

32-1288. Practicing without license; classification

It is a class 1 misdemeanor for a person to practice dental hygiene in this state unless the person has obtained a license from the board as provided in this article.

32-1289. Employment of dental hygienist by public agency, institution or school

A. A public health agency or institution or a public or private school authority may employ dental hygienists to perform necessary dental hygiene procedures under either direct or general supervision pursuant to section 32-1281.

B. A dental hygienist employed by or working under contract or as a volunteer for a public health agency or institution or a public or private school authority before an examination by a dentist may perform a screening or assessment and apply sealants and topical fluoride.

32-1289.01. Dental hygienists; affiliated practice relationships; rules; definition

A. A dentist who holds an active license pursuant to this chapter and a dental hygienist who holds an active license pursuant to this article may enter into an affiliated practice relationship to deliver dental hygiene services.

B. A dental hygienist shall satisfy all of the following to be eligible to enter into an affiliated practice relationship with a dentist pursuant to this section to deliver dental hygiene services in an affiliated practice relationship:

1. Hold an active license in good standing pursuant to this article.
2. Enter into an affiliated practice relationship with a dentist who holds an active license pursuant to this chapter.
3. Be actively engaged in dental hygiene practice for at least five hundred hours in each of the two years immediately preceding the affiliated practice relationship.

C. An affiliated practice agreement between a dental hygienist and a dentist shall be in writing and:

1. Shall identify at least the following:

(a) The affiliated practice settings in which the dental hygienist may deliver services pursuant to the affiliated practice relationship.

(b) The services to be provided and any procedures and standing orders the dental hygienist must follow. The standing orders shall include the circumstances in which a patient may be seen by the dental hygienist.

(c) The conditions under which the dental hygienist may administer local anesthesia and provide root planing.

(d) Circumstances under which the affiliated practice dental hygienist must consult with the affiliated practice dentist before initiating further treatment on patients who have not been seen by a dentist within twelve months after the initial treatment by the affiliated practice dental hygienist.

2. May include protocols for supervising dental assistants.

D. The following requirements apply to all dental hygiene services provided through an affiliated practice relationship:

1. Patients who have been assessed by the affiliated practice dental hygienist shall be directed to the affiliated practice dentist for diagnosis, treatment or planning that is outside the dental hygienist's scope of practice, and the affiliated practice dentist may make any necessary referrals to other dentists.

2. The affiliated practice dental hygienist shall consult with the affiliated practice dentist if the proposed treatment is outside the scope of the agreement.

3. The affiliated practice dental hygienist shall consult with the affiliated practice dentist before initiating treatment on patients presenting with a complex medical history or medication regimen.

4. The patient shall be informed in writing that the dental hygienist providing the care is a licensed dental hygienist and that the care does not take the place of a diagnosis or treatment plan by a dentist.

E. A contract for dental hygiene services with licensees who have entered into an affiliated practice relationship pursuant to this section may be entered into only by:

1. A health care organization or facility.

2. A long-term care facility.

3. A public health agency or institution.

4. A public or private school authority.

5. A government-sponsored program.

6. A private nonprofit or charitable organization.

7. A social service organization or program.

F. An affiliated practice dental hygienist may not provide dental hygiene services in a setting that is not listed in subsection E of this section.

G. Each dentist in an affiliated practice relationship shall:

1. Be available to provide an appropriate level of contact, communication and consultation with the affiliated practice dental hygienist during the business hours of the affiliated practice dental hygienist.

2. Adopt standing orders applicable to dental hygiene procedures that may be performed and populations that may be treated by the affiliated practice dental hygienist under the terms of the applicable affiliated practice agreement and to be followed by the affiliated practice dental hygienist in each affiliated practice setting in which the affiliated practice dental hygienist performs dental hygiene services under the affiliated practice relationship.

3. Adopt procedures to provide timely referral of patients referred by the affiliated practice dental hygienist to a licensed dentist for examination and treatment planning. If the examination and treatment planning is to be provided by the dentist, that treatment shall be scheduled in an appropriate time frame. The affiliated practice dentist or the dentist to whom the patient is referred shall be geographically available to see the patient.

4. Not permit the provision of dental hygiene services by more than six affiliated practice dental hygienists at any one time.

H. Each affiliated practice dental hygienist, when practicing under an affiliated practice relationship:

1. May perform only those duties within the terms of the affiliated practice relationship.

2. Shall maintain an appropriate level of contact, communication and consultation with the affiliated practice dentist.

3. Is responsible and liable for all services rendered by the affiliated practice dental hygienist under the affiliated practice relationship.

I. The affiliated practice dental hygienist and the affiliated practice dentist shall notify the board of the beginning of the affiliated practice relationship and provide the board with a copy of the agreement and any amendments to the agreement within thirty days after the effective date of the agreement or amendment. The affiliated practice dental hygienist and the affiliated practice dentist shall also notify the board within thirty days after the termination date of the affiliated practice relationship if this date is different than the agreement termination date.

J. Subject to the terms of the written affiliated practice agreement entered into between a dentist and a dental hygienist, a dental hygienist may:

1. Perform all dental hygiene procedures authorized by this chapter, except for performing any diagnostic procedures that are required to be performed by a dentist and administering nitrous oxide. The dentist's presence and an examination, diagnosis and treatment plan are not required unless specified by the affiliated practice agreement.

2. Supervise dental assistants, including dental assistants who are certified to perform functions pursuant to section 32-1291.

K. The board shall adopt rules regarding participation in affiliated practice relationships by dentists and dental hygienists that specify the following:

1. Additional continuing education requirements that must be satisfied by a dental hygienist.

2. Additional standards and conditions that may apply to affiliated practice relationships.

3. Compliance with the dental practice act and rules adopted by the board.

L. For the purposes of this section, "affiliated practice relationship" means the delivery of dental hygiene services, pursuant to an agreement, by a dental hygienist who is licensed pursuant to this article and who refers the patient to a dentist who is licensed pursuant to this chapter for any necessary further diagnosis, treatment and restorative care.

**32-1290. Grounds for censure, probation, suspension or revocation of license; procedure**

After a hearing pursuant to title 41, chapter 6, article 10, the board may suspend or revoke the license issued to a person under this article or censure or place on probation any such person for any of the causes set forth as grounds for censure, probation, suspension or revocation in section 32-1263.

**32-1291. Dental assistants; regulation; duties**

A. A dental assistant may expose radiographs for dental diagnostic purposes under either the general supervision of a dentist or the direct supervision of an affiliated practice dental hygienist licensed pursuant to this chapter if the assistant has passed an examination approved by the board.

B. A dental assistant may polish the natural and restored surfaces of the teeth under either the general supervision of a dentist or the direct supervision of an affiliated practice dental hygienist licensed pursuant to this chapter if the assistant has passed an examination approved by the board.

**32-1291.01. Expanded function dental assistants; training and examination requirements; duties**

A. A dental assistant may perform expanded functions after meeting one of the following:

1. Successfully completing a board-approved expanded function dental assistant training program at an institution accredited by the American dental association commission on dental accreditation and on successfully completing examinations in dental assistant expanded functions approved by the board.

2. Providing both:

(a) Evidence of currently holding or having held within the preceding ten years a license, registration, permit or certificate in expanded functions in restorative procedures issued by another state or jurisdiction in the United States.

(b) Proof acceptable to the board of clinical experience in the expanded functions listed in subsection B of this section.

B. Expanded functions include the placement, contouring and finishing of direct restorations or the placement and cementation of prefabricated crowns following the preparation of the tooth by a licensed dentist. The restorative materials used shall be determined by the dentist.

C. An expanded function dental assistant may place interim therapeutic restorations under the general supervision and direction of a licensed dentist following a consultation conducted through teledentistry.

D. An expanded function dental assistant may apply sealants and fluoride varnish under the general supervision and direction of a licensed dentist.

E. A licensed dental hygienist may engage in expanded functions pursuant to section 32-1281, subsection B, paragraph 12 following a course of study and examination equivalent to that required for an expanded function dental assistant as specified by the board.

32-1292. Restricted permits; suspension; expiration; renewal

A. The board may issue a restricted permit to practice dental hygiene to an applicant who:

1. Has a pending contract with a recognized charitable dental clinic or organization that offers dental hygiene services without compensation or at a rate that reimburses the clinic only for dental supplies and overhead costs and the applicant will not receive compensation for dental hygiene services provided at the clinic or organization.
2. Has a license to practice dental hygiene issued by a regulatory jurisdiction in the United States.
3. Has been actively engaged in the practice of dental hygiene for three years immediately preceding the application.
4. Is, to the board's satisfaction, competent to practice dental hygiene.
5. Meets the requirements of section 32-1284, subsection A that do not relate to examination.

B. A person who holds a restricted permit issued by the board may practice dental hygiene only in the course of the person's employment by a recognized charitable dental clinic or organization approved by the board.

C. The applicant for a restricted permit must file a copy of the person's employment contract with the board that includes a statement signed by the applicant that the applicant:

1. Understands that if that person's employment is terminated before the restricted permit expires, the permit is automatically revoked and that person must voluntarily surrender the permit to the board and is no longer eligible to practice unless that person meets the requirements of sections 32-1284 and 32-1285 or passes the examination required in this article.
2. Must be employed without compensation by a dental clinic or organization that is operated for a charitable purpose.
3. Is subject to the provisions of this chapter that apply to the regulation of dental hygienists.

D. The board may deny an application for a restricted permit if the applicant:

1. Has committed an act that is a cause for disciplinary action pursuant to this chapter.
2. While unlicensed, committed or aided and abetted the commission of any act for which a license is required pursuant to this chapter.
3. Knowingly made a false statement in the application.
4. Has had a license to practice dental hygiene revoked by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

5. Is currently under suspension or restriction by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

6. Has surrendered, relinquished or given up a license to practice dental hygiene instead of disciplinary action by a dental regulatory board in another jurisdiction in the United States for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

E. The board shall suspend an application for a restricted permit or an application for restricted permit renewal if the applicant is currently under investigation by a dental regulatory board in another jurisdiction. The board shall not issue or deny a restricted permit to the applicant until the investigation is resolved.

F. A restricted permit expires either one year after the date of issue or June 30, whichever date first occurs. The board may renew a restricted permit for terms that do not exceed one year.

**32-1292.01. Licensure by credential; examinations; waiver; fee**

A. The board by rule may waive the examination requirements of this article on receipt of evidence satisfactory to the board that the applicant has passed the clinical examination of another state or testing agency more than five years before submitting an application for licensure pursuant to this chapter and the other state or testing agency maintains a standard of licensure that is substantially equivalent to that of this state as determined by the board. The board by rule shall require:

1. A minimum number of active practice hours within a specific time period before the applicant submits the application. The board shall define what constitutes active practice.

2. An affirmation that the applicant has completed the continuing education requirements of the jurisdiction where the applicant is licensed.

B. The applicant shall pay a licensure by credential fee of not more than one thousand dollars as prescribed by the board.

## **Article 5 – Certification and Regulation of Denturists**

**32-1293. Practicing as denturist; denture technology; dental laboratory technician**

A. Notwithstanding the provisions of section 32-1202, nothing in this chapter shall be construed to prohibit a denturist certified pursuant to the provisions of this article from practicing denture technology.

B. A person is deemed to be practicing denture technology who:

1. Takes impressions and bite registrations for the purpose of or with a view to the making, producing, reproducing, construction, finishing, supplying, altering or repairing of complete upper or lower prosthetic dentures, or both, or removable partial dentures for the replacement of missing teeth.

2. Fits or advertises, offers, agrees, or attempts to fit any complete upper or lower prosthetic denture, or both, or adjusts or alters the fit of any full prosthetic denture, or fits or adjusts or alters the fit of removable partial dentures for the replacement of missing teeth.



C. In addition to the practices described in subsection B of this section, a person certified to practice denture technology may also construct, repair, reline, reproduce or duplicate full or partial prosthetic dentures or otherwise engage in the activities of a dental laboratory technician.

D. No person may perform an act described in subsection B of this section except a licensed dentist, a holder of a restricted permit pursuant to section 32-1238, a certified denturist or auxiliary personnel authorized to perform any such act by rule or regulation of the board pursuant to section 32-1207, subsection A, paragraph 1.

**32-1294. Supervision by dentist; definitions; mouth preparation by dentist; liability; business association**

A. A denturist may practice only in the office of a licensed dentist, denominated as such.

B. All work by a denturist shall be performed under the general supervision of a licensed dentist. For the purposes of this section, "general supervision" means the dentist is available for consultation in person or by phone during the performance of the procedures by a denturist pursuant to section 32-1293, subsection B. The dentist shall examine the patient initially, check the completed denture as to fit, form and function and perform such other procedures as the board may specify by rule or regulation. For the purposes of this section "completed denture" means a relined, rebased, duplicated or repaired denture or a new denture. Both the dentist and the denturist shall certify that the dentist has performed the initial examination and the final fitting as required in this subsection, and retain the certification in the patient's file.

C. When taking impressions or bite registrations for the purpose of constructing removable partial dentures or when checking the fit of a partial denture, all mouth preparation must be done by the dentist. The denturist is specifically prohibited from performing any cutting or surgery on hard or soft tissue in the mouth. By rule and regulation the board may further regulate the practice of the denturist in regard to removable partial dentures.

D. No more than two denturists may perform their professional duties under a dentist's general supervision at any one time.

E. A licensed dentist supervising a denturist shall be personally liable for any consequences arising from the performance of the denturist's duties.

F. A certified denturist and the dentist supervising his work may make any lawful agreement between themselves regarding fees, compensation and business association.

G. Any sign, advertisement or other notice displaying the name of the office must include the name of the responsible dentist.

**32-1295. Board of dental examiners; additional powers and duties**

A. In addition to other powers and duties prescribed by this chapter, the board shall:

1. As far as applicable, exercise the same powers and duties in administering and enforcing this article as it exercises under section 32-1207 in administering and enforcing other articles of this chapter.

2. Determine the eligibility of applicants for certification and issue certificates to applicants who it determines are qualified for certification.

3. Investigate charges of misconduct on the part of certified denturists.

4. Issue decrees of censure, fix periods and terms of probation, suspend or revoke certificates as the facts may warrant and reinstate certificates in proper cases.

B. The board may:

1. Adopt rules prescribing requirements for continuing education for renewal of all certificates issued pursuant to this article.

2. Hire consultants to assist the board in the performance of its duties.

C. In all matters relating to discipline and certifying of denturists and the approval of examinations, the board, by rule, shall provide for receiving the assistance and advice of denturists who have been previously certified pursuant to this chapter.

#### 32-1296. Qualifications of applicant

A. To be eligible for certification to practice denture technology an applicant shall:

1. Hold a high school diploma or its equivalent.

2. Present to the board evidence of graduation from a recognized denturist school or a certificate of satisfactory completion of a course or curriculum in denture technology from a recognized denturist school.

3. Pass a board-approved examination.

B. A candidate for certification shall submit a written application to the board that includes a nonrefundable Arizona dental jurisprudence examination fee as prescribed by the board.

#### 32-1297.01. Application for certification; fingerprint clearance card; denial; suspension

A. Each applicant for certification shall submit a written application to the board accompanied by a nonrefundable jurisprudence examination fee and obtain a valid fingerprint clearance card issued pursuant to section 41-1758.03.

B. The board may deny an application for certification or for certification renewal if the applicant:

1. Has committed any act that would be cause for censure, probation, suspension or revocation of a certificate under this chapter.

2. Has knowingly made any false statement in the application.

3. While uncertified, has committed or aided and abetted the commission of any act for which a certificate is required under this chapter.

4. Has had a certificate to practice denture technology revoked by a regulatory board in another jurisdiction in the United States or Canada for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

5. Is currently under investigation, suspension or restriction by a regulatory board in another jurisdiction in the United States or Canada for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

6. Has surrendered, relinquished or given up a certificate to practice denture technology in lieu of disciplinary action by a regulatory board in another jurisdiction in the United States or Canada for an act that occurred in that jurisdiction and that constitutes unprofessional conduct pursuant to this chapter.

C. The board shall suspend an application for certification if the applicant is currently under investigation by a denturist regulatory board in another jurisdiction. The board shall not issue or deny certification to the applicant until the investigation is resolved.

#### 32-1297.03. Qualification for reexamination

An applicant for examination who has previously failed two or more examinations, as a condition of eligibility to take any further examination, shall furnish to the board satisfactory evidence of having successfully completed additional training in a recognized denturist school or refresher courses approved by the board or the board's testing agency.

#### 32-1297.04. Fees

The board shall establish and collect fees, not to exceed the following amounts:

1. For an examination in jurisprudence, two hundred fifty dollars.
2. For each replacement or duplicate certificate, twenty-five dollars.

#### 32-1297.05. Disposition of revenues

The provisions of section 32-1212 shall apply to all fees, penalties and other revenues received by the board under this article.

#### 32-1297.06. Denturist certification; continuing education; certificate reinstatement; certificate for each place of practice; notice of change of address or place of practice; penalties

A. Except as provided in section 32-4301, a certification expires thirty days after the certificate holder's birth month every third year. On or before the last day of the certificate holder's birth month every third year, every certified denturist shall submit to the board a complete renewal application and shall pay a certificate renewal fee of not more than \$300, established by a formal vote of the board. At least once every three years, before establishing the fee, the board shall review the amount of the fee in a public meeting. Any change in the amount of the fee shall be applied prospectively to a certificate holder at the time of certification renewal. This requirement does not apply to a retired denturist or to a denturist with a disability.

B. A certificate holder shall include a written affidavit with the renewal application that affirms that the certificate holder complies with board rules relating to continuing education requirements. A certificate holder is not required to complete the written affidavit if the certificate holder received an initial certification within the year immediately preceding the expiration date of the certificate or the certificate holder is in disabled status. If the certificate holder is not in compliance with board rules relating to continuing education, the board may grant an extension of time to complete these requirements if the certificate holder includes a written request for an extension with the renewal application instead of the written affidavit and the renewal application is received on or before the last day of the certificate holder's birth month of the expiration year. The board shall consider the extension request based on criteria prescribed by the board by rule. If the board denies an extension request, the certificate expires thirty days after the certificate holder's birth month of the expiration year.

C. A person applying for a certificate for the first time in this state shall pay a prorated fee for the period remaining until the certificate holder's next birth month. This fee shall not exceed one-third of the fee established pursuant to subsection A of this section. Subsequent certifications shall be conducted pursuant to this section.

D. An expired certificate may be reinstated by submitting a complete renewal application within the twenty-four-month period immediately following the expiration of the certificate with payment of the renewal fee and a \$100 penalty. Whenever issued, reinstatement is as of the date of application and entitles the applicant to certification only for the remainder of the applicable three-year period. If a person does not reinstate a certificate pursuant to this subsection, the person must reapply for certification pursuant to this chapter.

E. Each certificate holder must provide to the board in writing both of the following:

1. A primary mailing address.
2. The address for each place of practice.

F. A certificate holder maintaining more than one place of practice shall obtain from the board a duplicate certificate for each office. The board shall set and charge a fee for each duplicate certificate. A certificate holder shall notify the board in writing within ten days after opening an additional place of practice.

G. A certificate holder shall notify the board in writing within ten days after changing a primary mailing address or place of practice address listed with the board. The board shall impose a \$50 penalty if a certificate holder fails to notify the board of the change within that time. The board shall increase the penalty imposed to \$100 if a certificate holder fails to notify it of the change within thirty days.

#### 32-1297.07. Discipline; procedure

A. After a hearing pursuant to title 41, chapter 6, article 10, the board may suspend or revoke the license issued to a person under this article or censure or place on probation any person for any of the causes set forth as grounds for censure, probation, suspension or revocation in section 32-1263.

B. The board on its own motion may investigate any evidence which appears to show the existence of any of the causes set forth in section 32-1263. The board shall investigate the report under oath of any person which appears to show the existence of any of the causes set forth in section 32-1263. Any person reporting pursuant to this section who provides the information in good faith shall not be subject to liability for civil damages as a result.

C. Except as provided in section 41-1092.08, subsection H, final decisions of the board are subject to judicial review pursuant to title 12, chapter 7, article 6.

### 32-1297.08. Injunction

A. An injunction shall issue to enjoin the practice of denture technology by any of the following:

1. One neither certified to practice as a denturist nor licensed to practice as a dentist.
2. One certified as a denturist from practicing without proper supervision by a dentist as required by this article.
3. A denturist whose continued practice will or might cause irreparable damage to the public health and safety prior to the time proceedings pursuant to section 32-1297.07 could be instituted and completed.

B. A petition for injunction shall be filed by the board in the superior court for Maricopa county or in the county where the defendant resides or is found. Any citizen is also entitled to obtain injunctive relief in any court of competent jurisdiction because of the threat of injury to the public health and welfare.

C. Issuance of an injunction shall not relieve the respondent from being subject to any other proceedings provided for by law.

### 32-1297.09. Violations; classification

A person is guilty of a class 2 misdemeanor who:

1. Not licensed as a dentist, practices denture technology without certification as provided by this article.
2. Exhibits or displays a certificate, diploma, degree or identification of another or a forged or fraudulent certificate, diploma, degree or identification with the intent that it be used as evidence of the right of such person to practice as a denturist in this state.
3. Fails to obey a summons or other order regularly and properly issued by the board.
4. Is a licensed dentist responsible for a denturist under this article who fails to personally supervise the work of the denturist.

## **Article 6 – Dispensing of Drugs and Devices**

### 32-1298. Dispensing of drugs and devices; conditions; civil penalty; definition

A. A dentist may dispense drugs, except schedule II controlled substances that are opioids, and devices kept by the dentist if:

1. All drugs are dispensed in packages labeled with the following information:
  - (a) The dispensing dentist's name, address and telephone number.

(b) The date the drug is dispensed.

(c) The patient's name.

(d) The name and strength of the drug, directions for its use and any cautionary statements.

2. The dispensing dentist enters into the patient's dental record the name and strength of the drug dispensed, the date the drug is dispensed and the therapeutic reason.

3. The dispensing dentist keeps all drugs in a locked cabinet or room, controls access to the cabinet or room by a written procedure and maintains an ongoing inventory of its contents.

B. Except in an emergency situation, a dentist who dispenses drugs for a profit without being registered by the board to do so is subject to a civil penalty by the board of not less than three hundred dollars and not more than one thousand dollars for each transaction and is prohibited from further dispensing for a period of time as prescribed by the board.

C. Before dispensing a drug pursuant to this section, the patient shall be given a written prescription on which appears the following statement in bold type: "This prescription may be filled by the prescribing dentist or by a pharmacy of your choice."

D. A dentist shall dispense for profit only to the dentist's own patient and only for conditions being treated by that dentist. The dentist shall provide direct supervision of an attendant involved in the dispensing process. For the purposes of this subsection, "direct supervision" means that a dentist is present and makes the determination as to the legitimacy or advisability of the drugs or devices to be dispensed.

E. This section shall be enforced by the board, which shall establish rules regarding labeling, recordkeeping, storage and packaging of drugs that are consistent with the requirements of chapter 18 of this title. The board may conduct periodic inspections of dispensing practices to ensure compliance with this section and applicable rules.

F. For the purposes of this section, "dispense" means the delivery by a dentist of a prescription drug or device to a patient, except for samples packaged for individual use by licensed manufacturers or repackagers of drugs, and includes the prescribing, administering, packaging, labeling and security necessary to prepare and safeguard the drug or device for delivery.

## **Article 7 – Rehabilitation**

[32-1299. Substance abuse treatment and rehabilitation program; private contract; funding; confidential stipulation agreement](#)

A. The board may establish a confidential program for the treatment and rehabilitation of dentists, dental therapists, denturists and dental hygienists who are impaired by alcohol or drug abuse. This program shall include education, intervention, therapeutic treatment and posttreatment monitoring and support.

B. The board may contract with other organizations to operate the program established pursuant to this section. A contract with a private organization shall include the following requirements:

1. Periodic reports to the board regarding treatment program activity.

2. Release to the board on demand of all treatment records.
  3. Periodic reports to the board regarding each dentist's, dental therapist's, denturist's or dental hygienist's diagnosis and prognosis and recommendations for continuing care, treatment and supervision.
  4. Immediate reporting to the board of the name of an impaired practitioner whom the treating organization believes to be a danger to self or others.
  5. Immediate reporting to the board of the name of a practitioner who refuses to submit to treatment or whose impairment is not substantially alleviated through treatment.
- C. The board may allocate an amount of not more than twenty dollars annually or sixty dollars triennially from each fee it collects from the renewal of active licenses for the operation of the program established by this section.
- D. A dentist, dental therapist, denturist or hygienist who, in the opinion of the board, is impaired by alcohol or drug abuse shall agree to enter into a confidential nondisciplinary stipulation agreement with the board. The board shall place a licensee or certificate holder on probation if the licensee or certificate holder refuses to enter into a stipulation agreement with the board and may take other action as provided by law. The board may also refuse to issue a license or certificate to an applicant if the applicant refuses to enter into a stipulation agreement with the board.
- E. In the case of a licensee or certificate holder who is impaired by alcohol or drug abuse after completing a second monitoring program pursuant to a stipulation agreement under subsection D of this section, the board shall determine whether:
1. To refer the matter for a formal hearing for the purpose of suspending or revoking the license or certificate.
  2. The licensee or certificate holder should be placed on probation for a minimum of one year with restrictions necessary to ensure public safety.
  3. To enter into another stipulation agreement under subsection D of this section with the licensee or certificate holder.

## **Article 8 – Mobile Dental Facilities and Portable Dental Units**

### **32-1299.21. Definitions**

In this article, unless the context otherwise requires:

1. "Mobile dental facility" means a facility in which dentistry is practiced and that is routinely towed, moved or transported from one location to another.
2. "Permit holder" means a dentist, dental hygienist, denturist or registered business entity that is authorized by this chapter to offer dental services in this state or a nonprofit organization, school district or school or institution of higher education that may employ a licensee to provide dental services and that is authorized by this article to operate a mobile dental facility or portable dental unit.
3. "Portable dental unit" means a nonfacility in which dental equipment used in the practice of dentistry is transported to and used on a temporary basis at an out-of-office location.

**32-1299.22. Mobile dental facilities; portable dental units; permits; exceptions**

A. Beginning January 1, 2012, every mobile dental facility and, except as provided in subsection B, every provider, program or entity using portable dental units in this state must obtain a permit pursuant to this article.

B. A licensee who does not hold a permit for a mobile dental facility or portable dental unit may provide dental services if:

1. Occasional services are provided to a patient of record of a fixed dental office who is treated outside of the dental office.
2. Services are provided by a federal, state or local government agency.
3. Occasional services are performed outside of the licensee's office without charge to a patient or a third party.
4. Services are provided to a patient by an accredited dental or dental hygiene school.
5. The licensee holds a valid permit to provide mobile dental anesthesia services.
6. The licensee is an affiliated practice dental hygienist.

**32-1299.23. Permit application; fees; renewal; notification of changes**

A. An individual or entity that seeks a permit to operate a mobile dental facility or portable dental unit must submit an application on a form provided by the board and pay an annual registration fee prescribed by the board by rule. The permit must be renewed annually not later than the last day of the month in which the permit was issued. Permits not renewed by the expiration date are subject to a late fee as prescribed by the board by rule.

B. A permit holder shall notify the board of any change in address or contact person within ten days after that change. The board shall impose a penalty as prescribed by the board by rule if the permit holder fails to notify the board of that change within that time.

C. If ownership of the mobile dental facility or portable dental unit changes, the prior permit is invalid and a new permit application must be submitted.

**32-1299.24. Standards of operation and practice**

A. A permit holder must:

1. Comply with all applicable federal, state and local laws, regulations and ordinances dealing with radiographic equipment, flammability, sanitation, zoning and construction standards, including construction standards relating to required access for persons with disabilities.
2. Establish written protocols for follow-up care for patients who are treated in a mobile dental facility or through a portable dental unit. The protocols must include referrals for treatment in a dental office that is permanently established within a reasonable geographic area and may include follow-up care by the mobile dental facility or portable dental unit.
3. Ensure that each mobile dental facility or portable dental unit has access to communication equipment that will enable dental personnel to contact appropriate assistance in an emergency.
4. Identify a person who is licensed pursuant to this chapter, who is responsible to supervise treatment and who, if required by law, will be present when dental services are rendered. This paragraph does



not prevent supervision by a dentist providing services or supervision pursuant to the exceptions prescribed in section 32-1231.

5. Display in or on the mobile dental facility or portable dental unit a current valid permit issued pursuant to this article in a manner that is readily observable by patients or visitors.

6. Provide a means of communication during and after business hours to enable the patient or the parent or guardian of a patient to contact the permit holder of the mobile dental facility or portable dental unit for emergency care, follow-up care or information about treatment received.

7. Comply with all requirements for maintenance of records pursuant to section 32-1264 and all other statutory requirements applicable to health care providers and patient records. All records, whether in paper or electronic form, if not in transit, must be maintained in a permanent, secure facility. Records of prior treatment must be readily available during subsequent treatment visits whenever practicable.

8. Ensure that all dentists, dental hygienists and denturists working in the mobile dental facility or portable dental unit hold a valid, current license issued by the board and that all delegated duties are within their respective scopes of practice as prescribed by the applicable laws of this state.

9. Maintain a written or electronic record detailing each location where services are provided, including:

(a) The street address of the service location.

(b) The dates of each session.

(c) The number of patients served.

(d) The types of dental services provided and the quantity of each service provided.

10. Provide to the board or its representative within ten days after a request for a record the written or electronic record required pursuant to paragraph 9 of this subsection.

11. Comply with current recommended infection control practices for dentistry as published by the national centers for disease control and prevention and as adopted by the board.

B. A mobile dental facility or portable dental unit must:

1. Contain equipment and supplies that are appropriate to the scope and level of treatment provided.

2. Have ready access to an adequate supply of potable water.

C. A permit holder or licensee who fails to comply with applicable statutes and rules governing the practice of dentistry, dental hygiene and denturism, the requirements for registered business entities or the requirements of this article is subject to disciplinary action for unethical or unprofessional conduct, as applicable.

#### **32-1299.25. Informed consent; information for patients**

A. The permit holder of a mobile dental facility or portable dental unit must obtain appropriate informed consent, in writing or by verbal communication, that is recorded by an electronic or digital device from the patient or the parent or guardian of the patient authorizing specific treatment before it is performed. The signed consent form or verbal communication shall be maintained as part of the patient's record as required in section 32-1264.

B. If services are provided to a minor, the signed consent form or verbal communication must inform the parent or guardian that the treatment of the minor by the mobile dental facility or portable dental unit may affect future benefits the minor may receive under private insurance, the Arizona health care cost containment system or the children's health insurance program.

C. At the conclusion of each patient's visit, the permit holder of a mobile dental facility or portable dental unit shall provide each patient with an information sheet that must contain:

1. Pertinent contact information as required by this section.
2. The name of the dentist or dental hygienist, or both, who provided services.
3. A description of the treatment rendered, including billed service codes, fees associated with treatment and tooth numbers if appropriate.
4. If necessary, referral information to another dentist as required by this article.

D. If the patient or the minor patient's parent or guardian has provided written consent to an institutional facility to access the patient's dental health records, the permit holder shall provide the institution with a copy of the information sheet provided in subsection C.

#### 32-1299.26. Disciplinary actions; cessation of operation

A. A permit holder for a mobile dental facility or portable dental unit that provides dental services to a patient shall refer the patient for follow-up treatment with a licensed dentist or the permit holder if treatment is clinically indicated. A permit holder or licensee who fails to comply with this subsection commits an act of unprofessional conduct or unethical conduct and is subject to disciplinary action pursuant to section 32-1263, subsection A, paragraph 1 or subsection C.

B. The board may do any of the following pursuant to its disciplinary procedures if a mobile dental facility or portable dental unit violates any statute or board rule:

1. Refuse to issue a permit.
2. Suspend or revoke a permit.
3. Impose a civil penalty of not more than two thousand dollars for each violation.

C. If a mobile dental facility or portable dental unit ceases operations, the permit holder must notify the board within thirty days after the last day of operation and must report on the disposition of patient records and charts. In accordance with applicable laws and rules, the permit holder must also notify all active patients of the disposition of records and make reasonable arrangements for the transfer of patient records, including copies of radiographs, to a succeeding practitioner or, if requested, to the patient. For the purposes of this subsection, "active patient" means any person whom the permit holder has examined, treated, cared for or consulted with during the two year period before the discontinuation of practice.

# ARIZONA ADMINISTRATIVE CODE (Rules)

## Title 4. Professions and Occupations

### Chapter 11. State Board of Dental Examiners

#### ARTICLE 1. DEFINITIONS

##### R4-11-101. Definitions

The following definitions, and definitions in A.R.S. § 32-1201, apply to this Chapter:

“Analgesia” means a state of decreased sensibility to pain produced by using nitrous oxide (N<sub>2</sub>O) and oxygen (O<sub>2</sub>) with or without local anesthesia.

“Application” means, for purposes of Article 3 only, forms designated as applications and all documents an additional information the Board requires to be submitted with an application.

“Business Entity” means a business organization that offers to the public professional services regulated by the Board and is established under the laws of any state or foreign country, including a sole practitioner, partnership, limited liability partnership, corporation, and limited liability company, unless specifically exempted by A.R.S. § 32-1213(J).

“Calculus” means a hard mineralized deposit attached to the teeth.

“Certificate holder” means a denturist who practices denture technology under A.R.S. Title 32, Chapter 11, Article 5.

“Charitable Dental Clinic or Organization” means a non-profit organization meeting the requirements of 26 U.S.C. 501(c)(3) and providing dental or dental hygiene services.

“Clinical evaluation” means a dental examination of a patient named in a complaint regarding the patient’s dental condition as it exists at the time the examination is performed.

“Closed subgingival curettage” means the removal of the inner surface of the soft tissue wall of a periodontal pocket in a situation where a flap of tissue has not been intentionally or surgically opened.

“Controlled substance” has the meaning prescribed in A.R.S. § 36-2501(A)(3).

“Credit hour” means one clock hour of participation in a recognized continuing dental education program.

“Deep sedation” is a drug-induced depression of consciousness during which a patient cannot be easily aroused but responds purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. The patient may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is maintained.

“Dental laboratory technician” or “dental technician” has the meaning prescribed in A.R.S. § 32-1201(7).

“Dentist of record” means a dentist who examines, diagnoses, and formulates treatment plans for a patient and may provide treatment to the patient.

“Designee” means a person to whom the Board delegates authority to act on the Board’s behalf regarding a particular task specified by this Chapter.

“Direct supervision” means, for purposes of Article 7 only, that a licensed dentist is present in the office and available to provide immediate treatment or care to a patient and observe a dental assistant’s work.

“Disabled” means a dentist, dental hygienist, or denturist has totally withdrawn from the active practice of dentistry, dental hygiene, or denturism due to a permanent medical disability and based on a physician’s order.

“Dispense for profit” means selling a drug or device for any amount above the administrative overhead costs to inventory.

“Documentation of attendance” means documents that contain the following information:

Name of sponsoring entity;

Course title;

Number of credit hours;

Name of speaker; and

Date, time, and location of the course.

“Drug” means:

Articles recognized, or for which standards or specifications are prescribed, in the official compendium;

Articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in the human body;

Articles other than food intended to affect the structure of any function of the human body; or

Articles intended for use as a component of any articles specified in this definition but does not include devices or components, parts, or accessories of devices.

“Emerging scientific technology” means any technology used in the treatment of oral disease that is not currently generally accepted or taught in a recognized dental or dental hygiene school and use of the technology poses material risks.

“Epithelial attachment” means the layer of cells that extends apically from the depth of the gingival (gum) sulcus (crevice) along the tooth, forming an organic attachment.

“Ex-parte communication” means a written or oral communication between a decision maker, fact finder, or Board member and one party to the proceeding, in the absence of other parties.

“General anesthesia” is a drug-induced loss of consciousness during which the patient is not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. The patient often requires assistance in maintaining a patent airway, and positive-pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

“General supervision” means, for purposes of Article 7 only, a licensed dentist is available for consultation, whether or not the dentist is in the office, regarding procedures or treatment that the dentist authorizes and for which the dentist remains responsible.

“Homebound patient” means a person who is unable to receive dental care in a dental office as a result of a medically diagnosed disabling physical or mental condition.

“Irreversible procedure” means a single treatment, or a step in a series of treatments, that causes change in the affected hard or soft tissues and is permanent or may require reconstructive or corrective procedures to correct the changes.

“Jurisdiction” means the Board’s power to investigate and rule on complaints that allege grounds for disciplinary action under A.R.S. Title 32, Chapter 11 or this Chapter.

“Licensee” means a dentist, dental hygienist, dental consultant, retired licensee, or person who holds a restricted permit under A.R.S. §§ 32-1237 or 32-1292.

“Local anesthesia” is the elimination of sensations, such as pain, in one part of the body by the injection of an anesthetic drug.

“Minimal sedation” is a minimally depressed level of consciousness that retains a patient’s ability to independently and continuously maintain an airway and respond appropriately to light tactile stimulation, not limited to reflex withdrawal from a painful stimulus, or verbal command and that is produced by a pharmacological or non-pharmacological method or a combination thereof. Although cognitive function and coordination may be modestly impaired, ventilatory and cardiovascular functions are unaffected. In accord with this particular definition, the drugs or techniques used should carry a margin of safety wide enough to render unintended loss of consciousness unlikely.

“Moderate sedation” is a drug-induced depression of consciousness during which a patient responds purposefully to verbal commands either alone or accompanied by light tactile stimulation, not limited to reflex withdrawal from a painful stimulus. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is maintained. The drugs or techniques used should carry a margin of safety wide enough to render unintended loss of consciousness unlikely. Repeated dosing of a drug before the effects of previous dosing can be fully recognized may result in a greater alteration of the state of consciousness than intended by the permit holder.

“Nitrous oxide analgesia” means nitrous oxide (N<sub>2</sub>O/O<sub>2</sub>) as an inhalation analgesic.

“Nonsurgical periodontal treatment” means plaque removal, plaque control, supragingival and subgingival scaling, root planing, and the adjunctive use of chemical agents.

“Official compendium” means the latest revision of the United States Pharmacopeia and the National Formulary and any current supplement.

“Oral sedation” is the enteral administration of a drug or non-drug substance or combination inhalation and enterally administered drug or non-drug substance in a dental office or dental clinic to achieve minimal or moderate sedation.

“Parenteral sedation” is a minimally depressed level of consciousness that allows the patient to retain the ability to independently and continuously maintain an airway and respond appropriately to physical stimulation or verbal command and is induced by a pharmacological or non-pharmacological method or a combination of both methods of administration in which the drug bypasses the gastrointestinal tract.

“Patient of record” means a patient who has undergone a complete dental evaluation performed by a licensed dentist.

“Periodontal examination and assessment” means to collect and correlate clinical signs and patient symptoms that point to either the presence of or the potential for periodontal disease.

“Periodontal pocket” means a pathologic fissure bordered on one side by the tooth and on the opposite side by crevicular epithelium and limited in its depth by the epithelial attachment.

“Plaque” means a film-like sticky substance composed of mucoidal secretions containing bacteria and toxic products, dead tissue cells, and debris.

“Polish” means, for the purposes of A.R.S. § 32-1291(B) only, a procedure limited to the removal of plaque and extrinsic stain from exposed natural and restored tooth surfaces that utilizes an appropriate rotary instrument with rubber cup or brush and polishing agent. A licensee or dental assistant shall not represent that this procedure alone constitutes an oral prophylaxis.

“Prescription-only device” means:

- Any device that is restricted by the federal act, as defined in A.R.S. § 32-1901, to use only under the supervision of a medical practitioner; or
- Any device required by the federal act, as defined in A.R.S. § 32-1901, to bear on its label the legend “Rx Only.”

“Prescription-only drug” does not include a controlled substance but does include:

- Any drug that, because of its toxicity or other potentiality for harmful effect, the method of its use, or the collateral measures necessary to its use, is not generally recognized among experts, qualified by scientific training and experience to evaluate its safety and efficacy, as safe for use except by or under the supervision of a medical practitioner;
- Any drug that is limited by an approved new drug application under the federal act or A.R.S. § 32-1962 to use under the supervision of a medical practitioner;
- Every potentially harmful drug, the labeling of which does not bear or contain full and adequate directions for use by the consumer; or
- Any drug required by the federal act to bear on its label the legend “RX Only.”

“President’s designee” means the Board’s executive director, an investigator, or a Board member acting on behalf of the Board president.

“Preventative and therapeutic agents” means substances used in relation to dental hygiene procedures that affect the hard or soft oral tissues to aid in preventing or treating oral disease.

“Prophylaxis” means a scaling and polishing procedure performed on patients with healthy tissues to remove coronal plaque, calculus, and stains.

“Public member” means a person who is not a dentist, dental hygienist, dental assistant, denturist, or dental technician.

“Recognized continuing dental education” means a program whose content directly relates to the art and science of oral health and treatment, provided by a recognized dental school as defined in A.R.S. § 32-1201(18), recognized dental hygiene school as defined in A.R.S. § 32-1201(17), or recognized denturist school as defined in A.R.S. § 32-1201(19), or sponsored by a national or state dental, dental hygiene, or denturist association, American Dental Association, Continuing Education Recognition Program (ADA CERP) or Academy of General Dentistry, Program Approval

for Continuing Education (AGDPACE) approved provider, dental, dental hygiene, or denturist study club, governmental agency, commercial dental supplier, non-profit organization, accredited hospital, or programs or courses approved by other state, district, or territorial dental licensing boards.

“Restricted permit holder” means a dentist who meets the requirements of A.R.S. § 32-1237 or a dental hygienist who meets the requirements of A.R.S. § 32-1292 and is issued a restricted permit by the Board.

“Retired” means a dentist, dental hygienist, or denturist is at least 65 years old and has totally withdrawn from the active practice of dentistry, dental hygiene, or denturism.

“Root planing” means a definitive treatment procedure designed to remove cementum or surface dentin that is rough, impregnated with calculus, or contaminated with toxins or microorganisms.

“Scaling” means use of instruments on the crown and root surfaces of the teeth to remove plaque, calculus, and stains from these surfaces.

“Section 1301 permit” means a permit to administer general anesthesia and deep sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (CRNA) under Article 13.

“Section 1302 permit” means a permit to administer parenteral sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (CRNA) under Article 13.

“Section 1303 permit” means a permit to administer oral sedation, employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (CRNA) under Article 13.

“Section 1304 permit” means a permit to employ or work with a physician anesthesiologist, or employ or work with a Certified Registered Nurse Anesthetist (CRNA) under Article 13.

“Study club” means a group of at least five Arizona licensed dentists, dental hygienists, or denturists who provide written course materials or a written outline for a continuing education presentation that meets the requirements of Article 12.

“Treatment records” means all documentation related directly or indirectly to the dental treatment of a patient.

#### **Historical Note**

Adopted effective May 12, 1977 (Supp. 77-3). Former Section R4-11-02 renumbered as Section R4-11-102 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-101 renumbered to R4-11-201, new Section R4-11-101 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 962, effective May 5, 2007 (Supp. 07-1). Amended by final rulemaking at 19 A.A.R. 334 and at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4).

#### **R4-11-102. Renumbered**

##### **Historical Note**

Adopted effective May 12, 1977 (Supp. 77-3). Former Section R4-11-02 renumbered as Section R4-11-102 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-102 renumbered to R4-11-202 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-103. Renumbered**

##### **Historical Note**

Adopted effective May 12, 1977 (Supp. 77-3). Former Section R4-11-03 renumbered as Section R4-11-103 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-103 renumbered to R4-11-203 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-104. Repealed**

##### **Historical Note**

Adopted effective May 12, 1977 (Supp. 77-3). Former Section R4-11-04 renumbered as Section R4-11-104 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-104 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-105. Repealed**

##### **Historical Note**

Adopted effective May 12, 1977 (Supp. 77-3). Former Section R4-11-05 renumbered as Section R4-11-105 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-105 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 2. LICENSURE BY CREDENTIAL**

### **R4-11-201. Clinical Examination; Requirements**

A. If an applicant is applying under A.R.S. §§ 32-1240(A) or 32-1292.01(A), the Board shall ensure that the applicant has passed the clinical examination of another state, United States territory, District of Columbia or a regional testing agency. Satisfactory completion of the clinical examination may be demonstrated by one of the following:

1. Certified documentation, sent directly from another state, United States territory, District of Columbia or a regional testing agency, that confirms successful completion of the clinical examination or multiple examinations administered by the state, United States territory, District of Columbia or regional testing agency. The certified documentation shall contain the name of the applicant, date of examination or examinations and proof of a passing score; or
2. Certified documentation sent directly from another state, United States territory or District of Columbia dental board that shows the applicant passed that state's, United States territory's or District of Columbia's clinical examination before that state's, United States territory's or District of Columbia's participation in a regional examination. The certified documentation shall contain the name of applicant, date of examination or examinations and proof of a passing score.

B. An applicant shall meet the licensure requirements in R4-11-301 and R4-11-303.

##### **Historical Note**

Former Rule 2a; Amended effective November 20, 1979 (Supp. 79-6). Amended effective November 28, 1980 (Supp. 80-6). Former Section R4-11-11 renumbered as Section R4-11-201 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-201 renumbered to R4-11-301, new Section R4-11-201 renumbered from R4-11-101 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(E), effective April 30, 2001 (Supp. 01-2). New Section made by final rulemaking at 9 A.A.R. 4126, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

### **R4-11-202. Dental Licensure by Credential; Application**

A. A dentist applying under A.R.S. § 32-1240(A) shall comply with all other applicable requirements in A.R.S. Title 32, Chapter 11 and this Article.

B. A dentist applying under A.R.S. § 32-1240(A)(1) shall:

1. Have a current dental license in another state, territory or district of the United States;
2. Submit a written affidavit affirming that the dentist has practiced dentistry for a minimum of 5000 hours during the five years immediately before applying for licensure by credential. For purposes of this subsection, dental practice includes experience as a dental educator at a dental program accredited by the American Dental Association Commission on Dental Accreditation or employment as a dentist in a public health setting;
3. Submit a written affidavit affirming that the applicant has complied with the continuing dental education requirement of the state in which the applicant is currently licensed; and

4. Provide evidence regarding the clinical examination by complying with R4-11- 201(A)(1).
- C. A dentist applying under A.R.S. § 32-1240(A)(2) shall submit certified documentation sent directly from the applicable state, United States territory, District of Columbia or regional testing agency to the Board that contains the name of applicant, date of examination or examinations and proof of a passing score.
- D. For any application submitted under A.R.S. § 32-1240(A), the Board may request additional clarifying evidence required under the applicable subsection in R4-11-201(A)(1).
- E. An applicant for dental licensure by credential shall pay the fee prescribed in A.R.S. § 32-1240, except the fee is reduced by 50% for applicants who will be employed or working under contract in:1. Commit to a three-year, exclusive service period,
1. Underserved areas, such as declared or eligible Health Professional Shortage Areas (HPSAs); or
  2. Other facilities caring for underserved populations as recognized by the Arizona Department of Health Services and approved by the Board.
- F. An applicant for dental licensure by credential who works in areas or facilities described in subsection (E) shall:
1. Commit to a three-year, exclusive service period,
  2. File a copy of a contract or employment verification statement with the Board, and
  3. As a licensee, submit an annual contract or employment verification statement to the Board by December 31 of each year.
- G. A licensee's failure to comply with the requirements in subsection (F) is considered unprofessional conduct and may result in disciplinary action based on the circumstances of the case.

#### **Historical Note**

Former Rule 2b; Former Section R4-11-12 renumbered as Section R4-11-202 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-202 repealed, new Section R4-11-202 renumbered from R4-11-102 and the heading amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Labeling changes made to reflect current style requirements (Supp. 99-1). Section expired under A.R.S. § 41-1056(E), effective April 30, 2001 (Supp. 01-2). New Section made by final rulemaking at 9 A.A.R. 4126, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

#### **R4-11-203. Dental Hygienist Licensure by Credential; Application**

- A. A dental hygienist applying under A.R.S. § 32-1292.01(A) shall comply with all other applicable requirements in A.R.S. Title 32, Chapter 11 and this Article.
- B. A dental hygienist applying under A.R.S. § 32-1292.01(A)(1) shall:
1. Have a current dental hygienist license in another state, territory, or district of the United States;
  2. Submit a written affidavit affirming that the applicant has practiced as a dental hygienist for a minimum of 1000 hours during the two years immediately before applying for licensure by credential. For purposes of this subsection, dental hygienist practice includes experience as a dental hygienist educator at a dental program accredited by the American Dental Association Commission on Dental Accreditation or employment as a dental hygienist in a public health setting;
  3. Submit a written affidavit affirming that the applicant has complied with the continuing dental hygienist education requirement of the state in which the applicant is currently licensed; and
  4. Provide evidence regarding the clinical examination by complying with one of the subsections in R4-11- 201(A)(1).
- C. A dental hygienist applying under A.R.S. § 32-1292.01(A)(2) shall submit certified documentation sent directly from the applicable state, United States territory, District of Columbia or regional testing agency to the Board that contains the name of applicant, date of examination or examinations and proof of a passing score.



D. For any application submitted under A.R.S. § 32-1292.01(A), the Board may request additional clarifying evidence as required under R4-11-201(A).

E. An applicant for dental hygienist licensure by credential shall pay the fee prescribed in A.R.S. § 32-1292.01, except the fee is reduced by 50% for applicants who will be employed or working under contract in:

1. Underserved areas such as declared or eligible Health Professional Shortage Areas (HPSAs); or
2. Other facilities caring for underserved populations, as recognized by the Arizona Department of Health Services and approved by the Board.

F. An applicant for dental hygienist licensure by credential who works in areas or facilities described in subsection (E) shall:

1. Commit to a three-year exclusive service period,
2. File a copy of a contract or employment verification statement with the Board, and
3. As a Licensee, submit an annual contract or employment verification statement to the Board by December 31 of each year.

G. A licensee's failure to comply with the requirements in R4-11-203(F) is considered unprofessional conduct and may result in disciplinary action based on the circumstances of the case.

#### **Historical Note**

Former Rule 2c; Former Section R4-11-13 repealed, new Section R4-11-13 adopted effective November 20, 1979 (Supp. 79-6). Amended effective October 30, 1980 (Supp. 80-5). Former Section R4-11-13 renumbered as Section R4-11-203 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-203 renumbered to R4-11-302, new Section R4-11-203 renumbered from R4-11-103 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(E), effective April 30, 2001 (Supp. 01-2). New Section made by final rulemaking at 9 A.A.R. 4126, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

#### **R4-11-204. Dental Assistant Radiography Certification by Credential**

Eligibility. To be eligible for dental assistant radiography certification by credential, an applicant shall have a current certificate or other form of approval for taking dental radiographs, issued by a professional licensing agency in another state, United States territory or the District of Columbia that required successful completion of a written dental radiography examination.

#### **Historical Note**

Former Rule 2d; Former Section R4-11-14 repealed, new Section R4-11-14 adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-14 renumbered as Section R4-11-204, repealed, and new Section R4-11-204 adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11-204 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). New Section made by final rulemaking at 9 A.A.R. 4126, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

#### **R4-11-205. Application for Dental Assistant Radiography Certification by Credential**

A. An applicant for dental assistant radiography certification by credential shall provide to the Board a completed application, on a form furnished by the Board that contains the following information:

1. A sworn statement of the applicant's eligibility, and
2. A letter from the issuing institution that verifies compliance with R4-11-204.

B. Based upon review of information provided under subsection (A), the Board or its designee shall request that an applicant for dental assistant radiography certification by credential provide a copy of a certified document that indicates the reason for a name change if the applicant's documentation contains different names.

#### **Historical Note**

Former Rule 2e; Former Section R4-11-15 renumbered as Section R4-11-205 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-205 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). New Section made by final rulemaking at 9 A.A.R. 4126, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-206. Repealed**

#### **Historical Note**

Former Rule 2f; Amended as an emergency effective July 7, 1978, pursuant to A.R.S. § 41-1003, valid for only 90 days (Supp. 78-4). Former emergency adoption now adopted and amended effective September 7, 1979 (Supp. 79-5). Former Section R4-11-16 renumbered as Section R4-11-206 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-206 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-207. Repealed**

#### **Historical Note**

Former Rule 2g; Former Section R4-11-17 renumbered as Section R4-11-207, repealed, and new Section R4-11-207 adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11-207 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-208. Repealed**

#### **Historical Note**

Former Section R4-11-20 repealed, new Section R4-11-20 adopted effective May 12, 1977 (Supp. 77-3). Amended effective October 30, 1980 (Supp. 80-5). Former Section R4-11-20 renumbered as Section R4-11-208 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-208 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-209. Repealed**

#### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-19 renumbered as R4-11-209 and repealed. Former Section R4-11-21 renumbered as Section R4-11-209 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-209 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-210. Repealed**

#### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Amended effective June 7, 1978 (Supp. 78-3). Former Section R4-11-22 renumbered as Section R4-11-210 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-210 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-211. Repealed**

#### **Historical Note**

Adopted effective August 26, 1977 (Supp. 77-4). Former Section R4-11-23 renumbered as Section R4-11-211 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-211 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-212. Repealed**

#### **Historical Note**

Adopted effective March 28, 1978 (Supp. 78-2). Former Section R4-11-24 renumbered as Section R4-11-212 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-212 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-213. Repealed**

##### **Historical Note**

Adopted as an emergency effective July 7, 1978, pursuant to A.R.S. § 41-1003, valid for only 90 days (Supp. 78-4). Former emergency adoption now adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-25 renumbered as Section R4-11-213, repealed, and new Section R4-11-213 adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11-213 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-214. Repealed**

##### **Historical Note**

Former Rule 2h; Amended effective March 23, 1976 (Supp. 76-2). Former Section R4-11-18 renumbered as Section R4-11-214 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-214 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-215. Repealed**

##### **Historical Note**

Adopted effective June 16, 1982 (Supp. 82-3). Former Section R4-11-215 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-216. Repealed**

##### **Historical Note**

Adopted effective June 16, 1982 (Supp. 82-3). Former Section R4-11-216 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 3. EXAMINATION, LICENSING QUALIFICATIONS, APPLICATION AND RENEWAL, TIME-FRAMES**

### **R4-11-301. Application**

A. An applicant for licensure or certification shall provide the following information and documentation:

1. A sworn statement of the applicant's qualifications for the license or certificate on a form provided by the Board;
2. A photograph of the applicant that is no more than 6 months old;
3. An official, sealed transcript sent directly to the Board from either:
  - a. The applicant's dental, dental hygiene, or denturist school, or
  - b. A verified third-party transcript provider.
4. Except for a dental consultant license applicant, dental and dental hygiene license applicants provide proof of successfully completing a clinical examination by submitting:
  - a. If applying for dental licensure by examination, a copy of the certificate or score card from the Western Regional Examining Board, indicating that the applicant passed the Western Regional Examining Board examination within the five years immediately before the date the application is filed with the Board;
  - b. If applying for dental hygiene licensure by examination, a copy of the certificate or scorecard from the Western Regional Examining Board or an Arizona Board-approved clinical examination administered by a state, United States territory, District of Columbia or regional testing agency. The certificate or scorecard must indicate that the applicant passed the examination within the five years immediately before the date the application is filed with the Board; or
  - c. If applying for licensure by credential, certified documentation sent directly from the applicable state, United States territory, District of Columbia or regional testing agency to the Board containing the name of the applicant, date of examination or examinations and proof of a passing score;

5. Except for a dental consultant license applicant as provided in A.R.S. § 32-1234(A)(7), dental and dental hygiene license applicants must have an official score card sent directly from the National Board examination to the Board;
  6. A copy showing the expiration date of the applicant's current cardiopulmonary resuscitation healthcare provider level certificate from the American Red Cross, the American Heart Association, or another certifying agency that follows the same procedures, standards, and techniques for CPR training and certification as the American Red Cross or American Heart Association;
  7. A license or certification verification from any other jurisdiction in which an applicant is licensed or certified, sent directly from that jurisdiction to the Board. If the license verification cannot be sent directly to the Board from the other jurisdiction, the applicant must submit a written affidavit affirming that the license verification submitted was issued by the other jurisdiction;
  8. If a dental or dental hygiene applicant has been licensed in another jurisdiction for more than six months, a copy of the self-inquiry from the National Practitioner Data Bank that is no more than 30 days old;
  9. If a denturist applicant has been certified in another jurisdiction for more than six months, a copy of the self-inquiry from the Health Integrity and Protection Data Bank that is no more than 30 days old;
  10. If the applicant is in the military or employed by the United States government, a letter of endorsement from the applicant's commanding officer or supervisor that confirms the applicant's military service or United States government employment record; and
  11. The jurisprudence examination fee.
- B. The Board may request that an applicant provide:
1. An official copy of the applicant's dental, dental hygiene, or denturist school diploma;
  2. A copy of a certified document that indicates the reason for a name change if the applicant's application contains different names,
  3. Written verification of the applicant's work history, and
  4. A copy of a high school diploma or equivalent certificate.
- C. An applicant shall pass the Arizona jurisprudence examination with a minimum score of 75%.

#### **Historical Note**

Former Rule 3A; Former Section R4-11-29 repealed, new Section R4-11-29 adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-29 renumbered as Section R4-11-301 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-301 repealed, new Section R4-11-301 renumbered from R4-11-201 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

#### **R4-11-302. Repealed**

#### **Historical Note**

Former Rule 3B; Former Section R4-11-30 repealed, new Section R4-11-30 adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-30 renumbered as Section R4-11-302 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-302 repealed, new Section R4-11-302 renumbered from R4-11-203 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1).

#### **R4-11-303. Application Processing Procedures: Issuance, Denial, and Renewal of Dental Licenses, Dental Therapy Licenses, Restricted Permits, Dental Hygiene Licenses, Dental Consultant Licenses, Denturist Certificates, Drug or Device Dispensing Registrations, Business Entity Registration and Mobile Dental Facility and Portable Dental Unit Permits**

A. The Board office shall complete an administrative completeness review within 30 calendar days of the date of receipt of an application for a license, certificate, permit, or registration.

1. Within 30 calendar days of receiving an initial or renewal application for a dental license, restricted permit, dental hygiene license, dental consultant license, denturist certificate, Business Entity registration, mobile dental facility or portable dental unit permit, the Board office shall notify the applicant, in writing, whether the application package is complete or incomplete.
2. If the application package is incomplete, the Board office shall provide the applicant with a written notice that includes a comprehensive list of the missing information. The 30 calendar day time-frame for the Board office to finish the administrative completeness review is suspended from the date the notice of incompleteness is served until the applicant provides the Board office with all missing information.
3. If the Board office does not provide the applicant with notice regarding administrative completeness, the application package shall be deemed complete 30 calendar days after receipt by the Board office.

B. An applicant with an incomplete application package shall submit all missing information within 60 calendar days of service of the notice of incompleteness.

C. Upon receipt of all missing information, the Board office shall notify the applicant, in writing, within 30 calendar days, that the application package is complete. If an applicant fails to submit a complete application package within the time allowed in subsection (B), the Board office shall close the applicant's file. An applicant whose file is closed and who later wishes to obtain a license, certificate, permit, or registration shall apply again as required in R4-11-301.

D. The Board shall not approve or deny an application until the applicant has fully complied with the requirements of A.A.C. Title 4, Chapter 11, Article 3.

E. The Board shall complete a substantive review of the applicant's qualifications in no more than 90 calendar days from the date on which the administrative completeness review of an application package is complete.

1. If the Board finds an applicant to be eligible for a license, certificate, permit, or registration and grants the license, certificate, permit, or registration, the Board office shall notify the applicant in writing.
2. If the Board finds an applicant to be ineligible for a license, certificate, permit, or registration, the Board office shall issue a written notice of denial to the applicant that includes:
  - a. Each reason for the denial, with citations to the statutes or rules on which the denial is based;
  - b. The applicant's right to request a hearing on the denial, including the number of days the applicant has to file the request;
  - c. The applicant's right to request an informal settlement conference under A.R.S. § 41-1092.06; and
  - d. The name and telephone number of an agency contact person who can answer questions regarding the application process.
3. If the Board finds deficiencies during the substantive review of an application package, the Board office may issue a comprehensive written request to the applicant for additional documentation. An additional supplemental written request for information may be issued upon mutual agreement between the Board or Board office and the applicant.
4. The 90-day time-frame for a substantive review of an applicant's qualifications is suspended from the date of a written request for additional documentation until the date that all documentation is received. The applicant shall submit the additional documentation before the next regularly scheduled Board meeting.
5. If the applicant and the Board office mutually agree in writing, the 90-day substantive review time-frame may be extended once for no more than 28 days.

F. The following time-frames apply for an initial or renewal application governed by this Section:

1. Administrative completeness review time-frame: 30 calendar days.
2. Substantive review time-frame: 90 calendar days.
3. Overall time-frame: 120 calendar days.

G. An applicant whose license is denied has a right to a hearing, an opportunity for rehearing, and, if the denial is upheld, may seek judicial review pursuant to A.R.S. Title 41, Chapter 6, Article 10, and A.R.S. Title 12, Chapter 7, Article 6.

#### **Historical Note**

Former Rule 3C; Former Section R4-11-31 renumbered as Section R4-11-303 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-303 repealed, new Section R4-11-303 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-304. Application Processing Procedures: Issuance and Denial of Dental Assistant Certificates Radiography Certification by Credential**

A. Within 30 calendar days of receiving an application from an applicant for a dental assistant radiography certification by credential, the Board or its designee shall notify the applicant, in writing, that the application package is complete or incomplete. If the package is incomplete, the notice shall specify what information is missing.

B. An applicant with an incomplete application package shall supply the missing information within 60 calendar days from the date of the notice. If the applicant fails to do so, an applicant shall begin the application process anew.

C. Upon receipt of all missing information, within 10 calendar days, the Board or its designee shall notify the applicant, in writing, that the application is complete.

D. The Board or its designee shall not process an application until the applicant has fully complied with the requirements of this Article.

E. The Board or its designee shall notify an applicant, in writing, whether the certificate is granted or denied, no later than 90 calendar days after the date of the notice advising the applicant that the package is complete.

F. The notice of denial shall inform the applicant of the following:

1. The reason for the denial, with a citation to the statute or rule which requires the applicant to pass the examination;
2. The applicant's right to request a hearing on the denial, including the number of days the applicant has to file the request;
3. The applicant's right to request an informal settlement conference under A.R.S. § 41-1092.06; and
4. The name and telephone number of an agency contact person or a designee who can answer questions regarding the application process.

G. The following time-frames apply for certificate applications governed by this Section:

1. Administrative completeness review time-frame: 24 calendar days.
2. Substantive review time-frame: 90 calendar days.
3. Overall time-frame: 114 calendar days.

H. An applicant whose certificate is denied has a right to a hearing, an opportunity for rehearing, and, if the denial is upheld, may seek judicial review pursuant to A.R.S. Title 41, Chapter 6, Article 10, and A.R.S. Title 12, Chapter 7, Article 6.

#### **Historical Note**

Former Rule 3D; Former Section R4-11-32 renumbered as Section R4-11-304 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-304 repealed, new Section R4-11-304 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

**R4-11-305. Application Processing Procedures: Issuance, Denial, and Renewal of General Anesthesia and Deep Sedation Permits, Parenteral Sedation Permits, Oral Sedation Permits, and Permit to Employ a Physician Anesthesiologist or Certified Registered Nurse Anesthetist**

A. The Board office shall complete an administrative completeness review within 24 days from the date of the receipt of an application for a permit.

1. Within 30 calendar days of receiving an initial or renewal application for a general anesthesia and deep sedation permit, parenteral sedation permit, oral sedation permit or permit to employ a physician anesthesiologist or CRNA the Board office shall notify the applicant, in writing, whether the application package is complete or incomplete.
2. If the application package is incomplete, the Board office shall provide the applicant with a written notice that includes a comprehensive list of the missing information. The 24-day time-frame for the Board office to finish the administrative completeness review is suspended from the date the notice of incompleteness is served until the applicant provides the Board office with all missing information.
3. If the Board office does not provide the applicant with notice regarding administrative completeness, the application package shall be deemed complete 24 days after receipt by the Board office.

B. An applicant with an incomplete application package shall submit all missing information within 60 calendar days of service of the notice of incompleteness.

C. Upon receipt of all missing information, the Board office shall notify the applicant, in writing, within 10 calendar days, that the application package is complete. If an applicant fails to submit a complete application package within the time allowed in subsection (B), the Board office shall close the applicant's file. An applicant whose file is closed and who later wishes to obtain a permit shall apply again as required in A.A.C. Title 4, Chapter 11, Article 13.

D. The Board shall not approve or deny an application until the applicant has fully complied with the requirements of this Section and A.A.C. Title 4, Chapter 11, Article 13.

E. The Board shall complete a substantive review of the applicant's qualifications in no more than 120 calendar days from the date on which the administrative completeness review of an application package is complete.

1. If the Board finds an applicant to be eligible for a permit and grants the permit, the Board office shall notify the applicant in writing.
2. If the Board finds an applicant to be ineligible for a permit, the Board office shall issue a written notice of denial to the applicant that includes:
  - a. Each reason for the denial, with citations to the statutes or rules on which the denial is based;
  - b. The applicant's right to request a hearing on the denial, including the number of days the applicant has to file the request;
  - c. The applicant's right to request an informal settlement conference under A.R.S. § 41-1092.06; and
  - d. The name and telephone number of an agency contact person who can answer questions regarding the application process.
3. If the Board finds deficiencies during the substantive review of an application package, the Board office shall issue a comprehensive written request to the applicant for additional documentation.
4. The 120-day time-frame for a substantive review of an applicant's qualifications is suspended from the date of a written request for additional documentation until the date that all documentation is received.
5. If the applicant and the Board office mutually agree in writing, the 120-day substantive review time-frame may be extended once for no more than 36 days.

F. The following time-frames apply for an initial or renewal application governed by this Section:

1. Administrative completeness review time-frame: 24 calendar days.
2. Substantive review time-frame: 120 calendar days.
3. Overall time-frame: 144 calendar days.

#### **Historical Note**

New Section R4-11-305 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 22 A.A.R. 371, effective April 3, 2016 (Supp. 16-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

## **ARTICLE 4. FEES**

### **R4-11-401. Retired or Disabled Licensure Renewal Fee**

As expressly authorized under A.R.S. § 32-1207(B)(3)(c), the licensure renewal fee for a retired or disabled dentist or dental hygienist is \$15.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Amended effective March 23, 1976 (Supp. 76-2). Former Section R4-11-42 renumbered as Section R4-11-401 and repealed effective July 29, 1981 (Supp. 81-4). Adopted effective February 16, 1995 (Supp. 95-1). Former Section R4-11-401 repealed, new Section R4-11-401 renumbered from R4-11-901 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section adopted by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 22 A.A.R. 3697, effective February 6, 2017 (Supp. 16-4).

### **R4-11-402. Business Entity Fees**

As expressly authorized under A.R.S. § 32-1213, the Board establishes and shall collect the following fees from a Business Entity offering dental services paid by credit card on the Board's website or by money order or cashier's check::

1. Initial triennial registration, \$300 per location;
2. Renewal of triennial registration, \$300 per location; and
3. Late triennial registration renewal, \$100 per location in addition to the fee under subsection (2).

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). amended effective March 23, 1976 (Supp. 76-2). Former Section R4-11-43 renumbered as Section R4-11-402, repealed, and new Section R4-11-402 adopted effective July 29, 1981 (Supp. 81-4). Amended effective February 16, 1995 (Supp. 95-1). Former Section R4-11-402 renumbered to R4-11-601, new Section R4-11-402 renumbered from R4-11-902 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section adopted by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (05-1). Amended by final rulemaking at 22 A.A.R. 3697, effective February 6, 2017 (Supp. 16-4). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

### **R4-11-403. Licensing Fees**

A. As expressly authorized under A.R.S. §§ 32-1236, 32-1276.02, 32-1287, and 32-1297.06, the Board establishes and shall collect the following licensing fees:

1. Dentist triennial renewal fee: \$510;
2. Dentist prorated initial license fee: \$110;
3. Dental hygienist triennial renewal fee: \$255;
4. Dental hygienist prorated initial license fee: \$55;
5. Denturist triennial renewal fee: \$233; and
6. Denturist prorated initial license fee: \$46.



B. The following license-related fees are established in or expressly authorized by statute. The Board shall collect the fees:

1. Jurisprudence examination fee:
  - a. Dentists: \$300;
  - b. Dental Hygienists: \$100; and
  - c. Denturists: \$250.
2. Licensure by credential fee:
  - a. Dentists: \$2,000; and
  - b. Dental hygienists: \$1,000.
3. Penalty to reinstate an expired license or certificate: \$100 for a dentist, dental hygienist, or denturist in addition to renewal fee specified under subsection (A).
4. Penalty for a dentist, dental hygienist, or denturist who fails to notify Board of a change of mailing address:
  - a. Failure after 10 days: \$50; and
  - b. Failure after 30 days: \$100.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-44 renumbered as Section R4-11-403 and repealed effective July 29, 1981 (Supp. 81-4). Adopted effective February 16, 1995 (Supp. 95-1). Former Section R4-11-403 renumbered to R4-11-602, new Section R4-11-403 renumbered from R4-11-903 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section adopted by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Section repealed by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (05-1). New Section made by final rulemaking at 22 A.A.R. 3697, effective February 6, 2017 (Supp. 16-4).

#### **R4-11-404. Repealed**

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-45 renumbered as Section R4-11-404 without change effective July 29, 1981 (Supp. 81-4). Repealed effective February 16, 1995 (Supp. 95-1). New Section R4-11-404 renumbered from R4-11-904 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Section repealed by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (05-1).

#### **R4-11-405. Charges for Board Services**

The Board shall charge the following for the services provided paid by credit card on the Board's website or by money order or cashier's check:

1. Duplicate license: \$25;
2. Duplicate certificate: \$25;
3. License verification: \$25;
4. Copy of audio recording: \$10;
5. Photocopies (per page): \$.25;
6. Mailing lists of Licensees in digital format: \$100.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-46 repealed, new Section R4-11-46 adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-46 renumbered as Section R4-11-405 without change effective July 29, 1981 (Supp. 81-4). Repealed effective February 16, 1995 (Supp. 95-1). New Section R4-11-405 renumbered from R4-11-905 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Amended by final rulemaking at 22 A.A.R.

3697, effective February 6, 2017 (Supp. 16-4). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-406. Anesthesia and Sedation Permit Fees**

A. As expressly authorized under A.R.S. § 32-1207, the Board establishes and shall collect the following fees:

1. Section 1301 permit fee: \$300 plus \$25 for each additional location;
2. Section 1302 permit fee: \$300 plus \$25 for each additional location;
3. Section 1303 permit fee: \$300 plus \$25 for each additional location; and
4. Section 1304 permit fee: \$300 plus \$25 for each additional location.

B. Upon successful completion of an initial onsite evaluation and upon receipt of the required permit fee, the Board shall issue a separate Section 1301, 1302, 1303, or 1304 permit to a dentist for each location requested by the dentist. A permit expires on December 31 of every fifth year.

C. Permit renewal fees:

1. Section 1301 permit renewal fee: \$300 plus \$25 for each additional location;
2. Section 1302 permit renewal fee: \$300 plus \$25 for each additional location;
3. Section 1303 permit renewal fee: \$300 plus \$25 for each additional location; and
4. Section 1304 permit renewal fee: \$300 plus \$25 for each additional location.

#### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-47 renumbered as Section R4-11-406 without change effective July 29, 1981 (Supp. 81-4). Repealed effective February 16, 1995 (Supp. 95-1). New Section R4-11-406 renumbered from R4-11-906 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section R4-11-406 renumbered from R4-11-407 and amended by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1). Amended by final rulemaking at 9 A.A.R. 4130, effective November 8, 2003 (Supp. 03-3). Amended by final rulemaking at 22 A.A.R. 3697, effective February 6, 2017 (Supp. 16-4).

#### **R4-11-407. Renumbered**

#### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-48 renumbered as Section R4-11-407 without change effective July 29, 1981 (Supp. 81-4). Repealed effective February 16, 1995 (Supp. 95-1). New Section R4-11-407 renumbered from R4-11-909 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section R4-11-407 renumbered to R4-11-406 by final rulemaking at 6 A.A.R. 748, effective February 2, 2000 (Supp. 00-1).

#### **R4-11-408. Repealed**

#### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-49 renumbered as Section R4-11-408 without change effective July 29, 1981 (Supp. 81-4). Repealed effective February 16, 1995 (Supp. 95-1).

#### **R4-11-409. Repealed**

#### **Historical Note**

Adopted effective September 12, 1985 (Supp. 85-5). Repealed effective July 21, 1995 (Supp. 95-3).

## **ARTICLE 5. DENTISTS**

### **R4-11-501. Dentist of Record**

A. A dentist of record shall ensure that each patient record has the treatment records for a patient treated in any dental office, clinic, hospital dental clinic, or charitable organization that offers dental services, and the full name of a dentist who is responsible for all of the patient's treatment.

B. A dentist of record shall obtain a patient's consent to change the treatment plan before changing the treatment plan that the patient originally agreed to, including any additional costs the patient may incur because of the change.

C. When a dentist who is a dentist of record decides to leave the practice of dentistry or a particular place of practice in which the dentist is the dentist of record, the dentist shall ensure before leaving the practice that a new dentist of record is entered on each patient record.

D. A dentist of record is responsible for the care given to a patient while the dentist was the dentist of record even after being replaced as the dentist of record by another dentist.

E. A dentist of record shall:

1. Remain responsible for the care of a patient during the course of treatment; and
2. Be available to the patient through the dentist's office, an emergency number, an answering service, or a substituting dentist.

F. A dentist's failure to comply with subsection (E) constitutes patient abandonment, and the Board may impose discipline under A.R.S. Title 32, Chapter 11, Article 3.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-62 renumbered as Section R4-11-501 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-501 repealed, new Section R4-11-501 renumbered from R4-11-1102 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-502. Affiliated Practice**

A. A dentist in a private for profit setting shall not enter into more than 15 affiliated practice relationships under A.R.S. § 32- 1289 at one time.

B. There is no limit to the number of affiliated practice relationships a dentist may enter into when working in a government, public health, or non-profit organization under Section 501(C)(3) of the Internal Revenue Code.

C. Each affiliated practice dentist shall be available telephonically or electronically during the business hours of the affiliated practice dental hygienist to provide an appropriate level of contact, communication, and consultation.

D. The affiliated practice agreement shall include a provision for a substitute dentist in addition to the requirements of A.R.S. § 32-1289(F), to cover an extenuating circumstance that renders the affiliated practice dentist unavailable for contact, communication, or consultation with the affiliated practice dental hygienist.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Amended effective March 23, 1976 (Supp. 76-2). Former Section R4-11-63 renumbered as Section R4-11-502 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-502 renumbered to R4-11-701 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). New Section made by final rulemaking at 13 A.A.R. 962, effective May 5, 2007 (Supp. 07-1).

#### **R4-11-503. Repealed**

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-64 repealed, new Section R4-11-64 adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-64 renumbered as Section R4-11-503 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-503 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-504. Renumbered**

##### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-65 repealed, new Section R4-11-65 adopted effective May 23, 1976 (Supp. 76-2). Former Section R4-11-65 renumbered as Section R4-11-504, repealed, and new Section R4-11-504 adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11-504 renumbered to R4-11-702 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-505. Repealed**

##### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-66 renumbered as Section R4-11-505 and repealed effective July 29, 1981 (Supp. 81-4).

#### **R4-11-506. Repealed**

##### **Historical Note**

Adopted effective March 23, 1976 (Supp. 76-2). Former Section R4-11-67 renumbered as Section R4-11-506 and repealed effective July 29, 1981 (Supp. 81-4).

## **ARTICLE 6. DENTAL HYGIENISTS**

### **R4-11-601. Duties and Qualifications**

A. A dental hygienist may apply Preventative and Therapeutic Agents under the general supervision of a licensed dentist.

B. A dental hygienist may perform a procedure not specifically authorized by A.R.S. § 32-1281 when all of the following conditions are satisfied:

1. The procedure is recommended or prescribed by the supervising dentist;
2. The dental hygienist has received instruction, training, or education to perform the procedure in a safe manner; and
3. The procedure is performed under the general supervision of a licensed dentist.

C. A dental hygienist shall not perform an Irreversible Procedure.

D. To qualify to use Emerging Scientific Technology as authorized by A.R.S. § 32-1281(C)(2), a dental hygienist shall successfully complete a course of study that meets the following criteria:

1. Is a course offered by a recognized dental school as defined in A.R.S. § 32-1201, a recognized dental hygiene school as defined in A.R.S. § 32-1201, or sponsored by a national or state dental or dental hygiene association or government agency;
2. Includes didactic instruction with a written examination;
3. Includes hands-on clinical instruction; and
4. Is technology that is scientifically based and supported by studies published in peer reviewed dental journals.

##### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-82 renumbered as Section R4-11-601 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-601 repealed, new Section R4-11-601 renumbered from R4-11-402 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 13 A.A.R. 962, effective May 5, 2007 (Supp. 07-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

### **R4-11-602. Care of Homebound Patients**

Dental hygienists treating homebound patients shall provide only treatment prescribed by the dentist of record in the diagnosis and treatment plan. The diagnosis and treatment plan shall be based on examination data obtained not more than 12 months before the treatment is administered.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-83 renumbered as Section R4-11-602 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-602 renumbered to R4-11-1001, new Section R4-11-602 renumbered from R4-11-403 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-603. Limitation on Number Supervised**

A dentist shall not supervise more than three dental hygienists at a time.

#### **Historical Note**

Adopted effective December 6, 1974 (Supp. 75-1). Former Section R4-11-84 renumbered as Section R4-11-603 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-603 renumbered to R4-11-1002, new Section R4-11-603 renumbered from R4-11-408 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-604. Selection Committee and Process**

A. The Board shall appoint a selection committee to screen candidates for the dental hygiene committee. The selection committee consists of three members. The Board shall appoint at least two members who are dental hygienists and one member who is a current Board member. The Board shall fill any vacancy for the unexpired portion of the term.

B. Each selection committee member's term is one year.

C. By majority vote, the selection committee shall nominate each candidate for the dental hygiene committee and transmit a list of names to the Board for approval, including at least one alternate.

#### **Historical Note**

New Section R4-11-604 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-605. Dental Hygiene Committee**

A. The Board shall appoint seven members to the dental hygiene committee as follows:

1. One dentist appointed at the annual December Board meeting, currently serving as a Board member, for a one year term;
2. One dental hygienist appointed at the annual December Board meeting, currently serving as a Board member and possessing the qualifications required in Article 6, for a one-year term;
3. Four dental hygienists that possess the qualifications required in Article 6; and
4. One lay person.

B. Except for members appointed as prescribed in subsections (A)(1) and (2), the Board shall appoint dental hygiene committee members for staggered terms of three years, beginning January 1, 1999, and limit each member to two consecutive terms. The Board shall fill any vacancy for the unexpired portion of the term.

C. The dental hygiene committee shall annually elect a chairperson at the first meeting convened during the calendar year.

#### **Historical Note**

New Section R4-11-605 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-606. Candidate Qualifications and Submissions**

A. A dental hygienist who seeks membership on the dental hygiene committee shall possess a license in good standing, issued by the Board.

B. A dental hygienist who is not a Board member and qualifies under subsection (A) shall submit a letter of intent and resume to the Board.

C. The selection committee shall consider all of the following criteria when nominating a candidate for the dental hygiene committee:

1. Geographic representation,
2. Experience in postsecondary curriculum analysis and course development,
3. Public health experience, and
4. Dental hygiene clinical experience.

#### **Historical Note**

New Section R4-11-606 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-607. Duties of the Dental Hygiene Committee**

A. The committee shall advise the Board on all matters relating to the regulation of dental hygienists.

B. In performing the duty in subsection (A), the committee may:

1. Act as a liaison for the Board, promoting communication and providing a forum for discussion of dental hygiene regulatory issues;
2. Review applications, syllabi, and related materials and make recommendations to the Board regarding certification of courses in Local Anesthesia, Nitrous Oxide Analgesia, and suture placement under Article 6 and other procedures which may require certification under Article 6;
3. Review documentation submitted by dental hygienists to determine compliance with the continuing education requirement for license renewal under Article 12 and make recommendations to the Board regarding compliance;
4. Make recommendations to the Board concerning statute and rule development which affect dental hygienists' education, licensure, regulation, or practice;
5. Provide advice to the Board on standards and scope of practice which affect dental hygiene practice;
6. Provide ad hoc committees to the Board upon request;
7. Request that the Board consider recommendations of the committee at the next regularly scheduled Board meeting; and
8. Make recommendations to the Board for approval of dental hygiene consultants.

C. Committee members who are licensed dentists or dental hygienists may serve as dental hygiene examiners or Board consultants.

D. The committee shall meet at least two times per calendar year. The chairperson or the president of the Board, or their respective designees, may call a meeting of the committee.

E. The Board may assign additional duties to the committee.

#### **Historical Note**

New Section R4-11-607 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-608. Dental Hygiene Consultants**

After submission of a current curriculum vitae or resume and approval by the Board, dental hygiene consultants may:

1. Act as dental hygiene examiners for the clinical portion of the dental hygiene examination;
2. Act as dental hygiene examiners for the Local Anesthesia portion of the dental hygiene examination;
3. Participate in Board-related procedures, including Clinical Evaluations, investigation of complaints concerning infection control, insurance fraud, or the practice of supervised personnel, and any other procedures not directly related to evaluating a dentist's quality of care; and
4. Participate in onsite office evaluations for infection control, as part of a team.

### Historical Note

New Section R4-11-608 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-609. Affiliated Practice**

A. To perform dental hygiene services under an affiliated practice relationship pursuant to A.R.S. § 32-1289.01, a dental hygienist shall:

1. Provide evidence to the Board of successfully completing a total of 12 hours of Recognized Continuing Dental Education that consists of the following subject areas:
  - a. A minimum of four hours in medical emergencies; and
  - b. A minimum of eight hours in at least two of the following areas:
    - i. Pediatric or other special health care needs,
    - ii. Preventative dentistry, or
    - iii. Public health community-based dentistry, and
2. Hold a current certificate in basic cardiopulmonary resuscitation (CPR).

B. A dental hygienist shall complete the required continuing dental education before entering an affiliated practice relationship. The dental hygienist shall complete the continuing dental education in subsection (A) before renewing the dental hygienist's license. The dental hygienist may take the continuing dental education online but shall not exceed the allowable hours indicated in R4-11-1209(B)(1).

C. To comply with A.R.S. § 32-1287(E) and this Section, a dental hygienist shall submit a completed affidavit on a form supplied by the Board office. Board staff shall review the affidavit to determine compliance with all requirements.

D. Each affiliated practice dentist shall be available telephonically or electronically during the business hours of the affiliated practice dental hygienist to provide an appropriate level of contact, communication, and consultation.

E. The affiliated practice agreement shall include a provision for a substitute dentist, to cover an extenuating circumstance that renders the affiliated practice dentist unavailable for contact, communication, and consultation with the affiliated practice dental hygienist.

### Historical Note

New Section made by final rulemaking at 13 A.A.R. 962, effective May 5, 2007 (Supp. 07-1). Amended by final rulemaking at 28 A.A.R. 1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

## **ARTICLE 7. DENTAL ASSISTANTS**

#### **R4-11-701. Procedures and Functions Performed by a Dental Assistant under Supervision**

A. A dental assistant may perform the following procedures and functions under the direct supervision of a licensed dentist:

1. Place dental material into a patient's mouth in response to a licensed dentist's instruction;
2. Cleanse the supragingival surface of the tooth in preparation for:
  - a. The placement of bands, crowns, and restorations;
  - b. Dental dam application;
  - c. Acid etch procedures; and
  - d. Removal of dressings and packs;
3. Remove excess cement from inlays, crowns, bridges, and orthodontic appliances with hand instruments;
4. Remove temporary cement, interim restorations, and periodontal dressings with hand instruments;
5. Remove sutures;
6. Place and remove dental dams and matrix bands;
7. Fabricate and place interim restorations with temporary cement;
8. Apply sealants;

9. Apply topical fluorides;
  10. Prepare a patient for nitrous oxide and oxygen analgesia administration upon the direct instruction and presence of a dentist; or
  11. Observe a patient during nitrous oxide analgesia as instructed by the dentist.
- B. A dental assistant may perform the following procedures and functions under the general supervision of a licensed dentist:
1. Train or instruct patients in oral hygiene techniques, preventive procedures, dietary counseling for caries and plaque control, and provide pre-and post-operative instructions relative to specific office treatment;
  2. Collect and record information pertaining to extraoral conditions; and
  3. Collect and record information pertaining to existing intraoral conditions.

#### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-100 renumbered as Section R4-11-701 and amended effective July 29, 1981 (Supp. 81-4). Former Section R4-11-701 renumbered to R4-11-1701, new Section R4-11-701 renumbered from R4-11-502 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-702. Limitations on Procedures or Functions Performed by a Dental Assistant under Supervision**

A dental assistant shall not perform the following procedures or functions:

1. A procedure which by law only licensed dentists, licensed dental hygienists, or certified denturists can perform;
2. Intraoral carvings of dental restorations or prostheses;
3. Final jaw registrations;
4. Taking final impressions for any activating orthodontic appliance, fixed or removable prosthesis;
5. Activating orthodontic appliances; or
6. An irreversible procedure.

#### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-101 renumbered as Section R4-11-702 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-702 repealed, new Section R4-11-702 renumbered from R4-11-504 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-703. Repealed**

#### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-102 renumbered as Section R4-11-703 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-703 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-704. Repealed**

#### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-103 renumbered as Section R4-11-704 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-704 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-705. Repealed**

#### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-104 renumbered as Section R4-11-705 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-705 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).



#### **R4-11-706. Repealed**

##### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-105 renumbered as Section R4-11-706 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-706 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-707. Repealed**

##### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-106 renumbered as Section R4-11-707 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-707 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-708. Repealed**

##### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-107 renumbered as Section R4-11-708 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-708 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-709. Repealed**

##### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-108 renumbered as Section R4-11-709 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-709 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-710. Repealed**

##### **Historical Note**

Adopted effective April 27, 1977 (Supp. 77-2). Former Section R4-11-109 renumbered as Section R4-11-710 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-710 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 8. DENTURISTS**

#### **R4-11-801. Expired**

##### **Historical Note**

Adopted effective March 28, 1978 (Supp. 78-2). Former Section R4-11-120 renumbered as Section R4-11-801 without change effective July 29, 1981 (Supp. 81-4). Section R4-11-801 repealed, new Section filed April 4, 1986, adopted effective January 1, 1988 (Supp. 86-2). Amended effective May 17, 1995 (Supp. 95-2). Former Section R4-11-801 repealed, new Section R4-11-801 renumbered from R4-11-1201 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17-3).

#### **R4-11-802. Expired**

##### **Historical Note**

Adopted effective March 28, 1978 (Supp. 78-2). Former Section R4-11-121 renumbered as Section R4-11-802 without change effective July 29, 1981 (Supp. 81-4). Section R4-11-802 repealed, new Section filed April 4, 1986, adopted effective January 1, 1988 (Supp. 86-2). Amended effective May 17, 1995 (Supp. 95-2). Former Section R4-11-802 renumbered to R4-11-1301, new Section R4-11-802 renumbered from R4-11-1202 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17-3).

#### **R4-11-803. Renumbered**

##### **Historical Note**

Adopted effective March 28, 1978 (Supp. 78-2). Former Section R4-11-122 renumbered as Section R4-11-803 without change effective July 29, 1981 (Supp. 81-4). Section R4-11-803 repealed, new Section filed April 4, 1986, adopted effective January 1, 1988 (Supp. 86-2). Amended effective May 17, 1995 (Supp. 95-2). Former Section R4- 11-803 renumbered to R4-11-1302 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-804. Renumbered**

##### **Historical Note**

Adopted effective March 28, 1978 (Supp. 78-2). Former Section R4-11-123 renumbered as Section R4-11-804 without change effective July 29, 1981 (Supp. 81-4). Section R4-11-804 repealed, new Section filed April 4, 1986, adopted effective January 1, 1988 (Supp. 86-2). Former Section R4-11-804 renumbered to R4-11-1303 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-805. Renumbered**

##### **Historical Note**

Adopted as filed April 4, 1986, adopted effective January 1, 1988 (Supp. 86-2). Amended effective May 17, 1995 (Supp. 95-2). Former Section R4-11-805 renumbered to R4-11-1304 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-806. Renumbered**

##### **Historical Note**

Adopted effective May 17, 1995 (Supp. 95-2). Former Section R4-11-806 renumbered to R4-11-1305 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 9. RESTRICTED PERMITS**

### **R4-11-901. Application for Restricted Permit**

A. An applicant for a restricted permit shall provide the following information and documentation on a form provided by the Board:

1. A sworn statement of the applicant's qualifications for a restricted permit;
2. A photograph of the applicant that is no more than six months old;
3. A letter from any other jurisdiction in which an applicant is licensed or certified verifying that the applicant is licensed or certified in that jurisdiction, sent directly from that jurisdiction to the Board;
4. If the applicant is in the military or employed by the United States government, a letter from the applicant's commanding officer or supervisor verifying the applicant is licensed or certified by the military or United States government;
5. A copy of the applicant's current cardiopulmonary resuscitation certification that meets the requirements of R4-11-301(A)(6); and
6. A copy of the applicant's pending contract with a Charitable Dental Clinic or Organization offering dental or dental hygiene services.

B. The Board may request that an applicant provide a copy of a certified document that indicates the reason for a name change if the applicant's application contains different names.

##### **Historical Note**

Adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-130 renumbered as Section R4-11-901, repealed, and new Section R4-11-901 adopted effective July 29, 1981 (Supp. 81-4). Amended effective April 4, 1986 (Supp. 86-2). Emergency amendment adopted effective June 18, 1991, pursuant to A.R.S. § 41-1026, valid for only 90 days (Supp. 91-2). Emergency expired. Adopted effective July 13, 1992 (Supp. 92-3). Former Section R4-11-901 renumbered to R4-11-401, new Section R4-11-901 renumbered from R4-11-1001 and amended by final rulemaking at 5 A.A.R. 580,

effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 28 A.A.R.1885 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-902. Issuance of a Restricted Permit**

Before issuing a restricted permit under A.R.S. §§ 32-1237 through 32-1239 or 32-1292, the Board shall investigate the statutory qualifications of the charitable dental clinic or organization. The Board shall not recognize a dental clinic or organization under A.R.S. §§ 32-1237 through 32-1239 or 32-1292 as a charitable dental clinic or organization permitted to employ dentists or dental hygienists not licensed in Arizona who hold restricted permits unless the Board makes the following findings of fact:

1. That the entity is a dental clinic or organization offering professional dental or dental hygiene services in a manner consistent with the public health;
2. That the dental clinic or organization offering dental or dental hygiene services is operated for charitable purposes only, offering dental or dental hygiene services either without compensation to the clinic or organization or with compensation at the minimum rate to provide only reimbursement for dental supplies and overhead costs;
3. That the persons performing dental or dental hygiene services for the dental clinic or organization do so without compensation; and
4. That the charitable dental clinic or organization operates in accordance with applicable provisions of law.

#### **Historical Note**

Adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-131 renumbered as Section R4-11- 902, repealed, and new Section R4-11-902 adopted effective July 29, 1981 (Supp. 81-4). Amended effective April 4, 1986 (Supp. 86-2). Emergency amendment adopted effective June 18, 1991, pursuant to A.R.S. § 41-1026, valid for only 90 days (Supp. 91-2). Emergency expired. Adopted effective July 13, 1992 (Supp. 92-3). Former Section R4-11-902 renumbered to R4-11-402, new Section R4-11-902 renumbered from R4-11-1002 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-903. Recognition of a Charitable Dental Clinic Organization**

In order for the Board to make the findings required in R4-11-902, the charitable clinic or organization shall provide information to the Board, such as employment contracts with restricted permit holders, Articles and Bylaws, and financial records.

#### **Historical Note**

Adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-132 renumbered as Section R4-11- 903, repealed, and new Section R4-11-903 adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11- 903 renumbered to R4-11-403, new Section R4-11-903 renumbered from R4-11-1003 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-904. Determination of Minimum Rate**

In determining whether professional services are provided at the minimum rate to provide reimbursement for dental supplies and overhead costs under A.R.S. §§ 32-1237(1) or 32-1292(A)(1), the Board shall obtain and review information relating to the actual cost of dental supplies to the dental clinic or organization, the actual overhead costs of the dental clinic or organization, the amount of charges for the dental or dental hygiene services offered, and any other information relevant to its inquiry.

#### **Historical Note**

Adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-133 renumbered as Section R4-11- 904 without change effective July 29, 1981 (Supp. 81-4). Former Section R4-11-904

renumbered to R4-11-404, new Section R4-11-904 renumbered from R4-11-1004 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-905. Expired**

##### **Historical Note**

Adopted effective September 7, 1979 (Supp. 79-5). Former Section R4-11-134 renumbered as Section R4-11- 905 without change effective July 29, 1981 (Supp. 81-4). Amended effective April 4, 1986 (Supp. 86-2). Former Section R4-11-905 renumbered to R4-11-405, new Section R4-11-905 renumbered from R4-11-1005 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17- 3).

#### **R4-11-906. Expired**

##### **Historical Note**

Adopted effective July 29, 1981 (Supp. 81-4). Amended effective April 4, 1986 (Supp. 86-4). Emergency amendment adopted effective June 18, 1991, pursuant to A.R.S. § 41-1026, valid for only 90 days (Supp. 91-2). Emergency expired. Adopted effective July 13, 1992 (Supp. 92-3). Former Section R4-11-906 renumbered to R4-11- 406, new Section R4-11-906 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17-3).

#### **R4-11-907. Repealed**

##### **Historical Note**

Adopted effective April 4, 1986 (Supp. 86-2). Former Section R4-11-907 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-908. Repealed**

##### **Historical Note**

Adopted effective April 4, 1986 (Supp. 86-2). Former Section R4-11-908 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-909. Renumbered**

##### **Historical Note**

Adopted effective May 17, 1995 (Supp. 95-2). Former Section R4-11-909 renumbered to R4-11-407 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 10. DENTAL TECHNICIANS**

#### **R4-11-1001. Expired**

##### **Historical Note**

Adopted effective November 28, 1980 (Supp. 80-6). Former Section R4-11-140 renumbered as Section R4-11- 1001 without change effective July 29, 1981 (Supp. 81- 4). Former Section R4-11-1001 renumbered to R4-11- 901, new Section R4-11-1001 renumbered from R4-11- 602 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17-3).

#### **R4-11-1002. Expired**

##### **Historical Note**

Adopted effective November 28, 1980 (Supp. 80-6). Former Section R4-11-141 renumbered as Section R4-11- 1002 without change effective July 29, 1981 (Supp. 81- 4). Former Section R4-11-1002 renumbered to R4-11- 902, new Section R4-11-1002 renumbered from R4-11- 603 and amended

by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(J) at 23 A.A.R. 2575, effective August 25, 2017 (Supp. 17-3).

#### **R4-11-1003. Renumbered**

##### **Historical Note**

Adopted effective November 28, 1980 (Supp. 80-6). Former Section R4-11-142 renumbered as Section R4-11- 1003 without change effective July 29, 1981 (Supp. 81- 4). Former Section R4-11-1003 renumbered to R4-11-903 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1004. Renumbered**

##### **Historical Note**

Adopted effective November 28, 1980 (Supp. 80-6). Former Section R4-11-143 renumbered as Section R4-11- 1004 without change effective July 29, 1981 (Supp. 81- 4). Former Section R4-11-1004 renumbered to R4-11-904 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1005. Renumbered**

##### **Historical Note**

Adopted effective November 28, 1980 (Supp. 80-6). Former Section R4-11-144 renumbered as Section R4-11- 1005 without change effective July 29, 1981 (Supp. 81- 4). Former Section R4-11-1005 renumbered to R4-11-905 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1006. Repealed**

##### **Historical Note**

Adopted effective September 12, 1985 (Supp. 85-5). Repealed effective July 21, 1995 (Supp. 95-3).

## **ARTICLE 11. ADVERTISING**

### **R4-11-1101. Advertising**

A dentist may advertise specific dental services or certification in a non-specialty area only if the advertisement includes the phrase “Services provided by an Arizona licensed general dentist.” A dental hygienist may advertise specific dental hygiene services only if the advertisement includes the phrase “Services provided by an Arizona licensed dental hygienist.” A denturist may advertise specific denture services only if the advertisement includes the phrase “Services provided by an Arizona certified denturist.”

##### **Historical Note**

Adopted effective July 29, 1981 (Supp. 81-4). Amended by repealing the former guideline on “Management of Craniomandibular Disorders” and adopting a new guideline effective June 16, 1982 (Supp. 82-3). Repealed effective November 20, 1992 (Supp. 92-4). Former Section R4-11-1101 repealed, new Section R4-11-1101 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05- 1).

### **R4-11-1102. Advertising as a Recognized Specialist**

A. A dentist may advertise as a specialist or use the terms “specialty” or “specialist” to describe professional services only if the dentist limits the dentist’s practice exclusively to one or more specialty area that are:

1. Recognized by a board that certifies specialists for the area of specialty; and
2. Accredited by the Commission on Dental Accreditation of the American Dental Association.

B. The following specialty areas meet the requirements of subsection (A):

1. Endodontics,

2. Oral and maxillofacial surgery,
3. Orthodontics and dentofacial orthopedics,
4. Pediatric dentistry,
5. Periodontics,
6. Prosthodontics,
7. Dental Public Health,
8. Oral and Maxillofacial Pathology, and
9. Oral and Maxillofacial Radiology.

C. For purposes of this Article, a dentist who wishes to advertise as a specialist or a multiple-specialist in a recognized field under subsection (B) shall meet the criteria in one or more of the following categories:

1. Grandfathered: A dentist who declared a specialty area before December 31, 1964, according to requirements established by the American Dental Association, and has a practice limited to a dentistry area approved by the American Dental Association;
2. Educationally qualified: A dentist who has successfully completed an educational program of two or more years in a specialty area accredited by the Commission on Dental Accreditation of the American Dental Association, as specified by the Council on Dental Education of the American Dental Association;
3. Board eligible: A dentist who has met the guidelines of a specialty board that operates in accordance with the requirements established by the American Dental Association in a specialty area recognized by the Board, if the specialty board:
  - a. Has established examination requirements and standards,
  - b. Appraised an applicant's qualifications,
  - c. Administered comprehensive examinations, and
  - d. Upon completion issues a certificate to a dentist who has achieved diplomate status;
 or
4. Board certified: A dentist who has met the requirements of a specialty board referenced in subsection (C)(3), and who has received a certificate from the specialty board, indicating the dentist has achieved diplomate status.

D. A dentist, dental hygienist, or denturist whose advertising implies that services rendered in a dental office are of a specialty area other than those listed in subsection (B) and recognized by a specialty board that has been accredited by the Commission on Dental Accreditation of the American Dental Association violates this Article and A.R.S. § 32-1201(18)(u), and is subject to discipline under A.R.S. Title 32, Chapter 11.

#### **Historical Note**

Adopted effective July 29, 1981 (Supp. 81-4). Former Section R4-11-1102 renumbered to R4-11-501 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-1103. Reserved**

#### **R4-11-1104. Repealed**

#### **Historical Note**

Adopted effective November 25, 1985 (Supp. 85-6). Former Section R4-11-1104 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1105. Repealed**

#### **Historical Note**

Adopted effective September 12, 1985 (Supp. 85-5). Repealed effective July 21, 1995 (Supp. 95-3).

## ARTICLE 12. CONTINUING DENTAL EDUCATION AND RENEWAL REQUIREMENTS

### R4-11-1201. Continuing Dental Education

A. A licensee or certificate holder shall:

1. Satisfy a continuing dental education requirement that is designed to provide an understanding of current developments, skills, procedures, or treatment related to the licensee's or certificate holder's practice; and
2. Complete the recognized continuing dental education required by this Article each renewal period.

B. A licensee or certificate holder receiving an initial license or certificate shall complete the prescribed credit hours of recognized continuing dental education by the end of the first full renewal period.

#### Historical Note

Adopted effective May 21, 1982 (Supp. 82-3). Former Section R4-11-1201 renumbered to R4-11-801, new Section R4-11-1201 renumbered from R4-11-1402 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

### R4-11-1202. Continuing Dental Education Compliance and Renewal Requirements

A. When applying for a renewal license, certificate, or restricted permit, a Licensee, dentist, or Restricted Permit holder shall complete a renewal application provided by the Board.

B. Before receiving a renewal license or certificate, each Licensee or dentist shall possess a current form of one of the following:

1. A current cardiopulmonary resuscitation healthcare provider level certificate from the American Red Cross, the American Heart Association, or another certifying agency;
2. Advanced cardiac life support course completion confirmation from the American Heart Association or another agency. The confirmation must indicate that the course was completed within two years immediately before submitting a renewal application; or
3. Pediatric advanced life support course completion confirmation from the American Heart Association or another agency. The confirmation must indicate that the course was completed within two years immediately before submitting a renewal application.

C. A Licensee or dentist shall include an affidavit affirming the Licensee's or dentist's completion of the prescribed Credit Hours of Recognized Continuing Dental Education with a renewal application. A Licensee or dentist shall include on the affidavit the Licensee's or dentist's name, license or certificate number, the number of hours completed in each category, and the total number of hours completed for activities defined in R4-11-1209(A)(4).

D. A Licensee or dentist shall submit a written request for an extension before the renewal deadline prescribed in A.R.S. §§ 32-1236, 32-1276.02, 32-1287, and 32-1297.06. If a Licensee or dentist fails to meet the Credit Hours requirement because of military service, dental or religious missionary activity, residence in a foreign country, or other extenuating circumstances as determined by the Board, the Board, upon written request, may grant an extension of time to complete the Recognized Continuing Dental Education Credit Hour requirement.

E. The Board shall:

1. Only accept Recognized Continuing Dental Education credits accrued during the prescribed period immediately before license or certificate renewal, and
2. Not allow Recognized Continuing Dental Education credit accrued in a renewal period in excess of the amount required in this Article to be carried forward to the next renewal period.

F. A Licensee or dentist shall maintain Documentation of Attendance for each program for which credit is claimed that verifies the Recognized Continuing Dental Education Credit Hours the Licensee or dentist participated in during the most recently completed renewal period.

G. Each year, the Board shall audit continuing dental education requirement compliance on a random basis or when information is obtained which indicates a Licensee or dentist may not be in compliance with this Article. A Licensee or dentist selected for audit shall provide the Board with Documentation

of Attendance that shows compliance with the continuing dental education requirements within 35 calendar days from the date the Board issues notice of the audit by certified mail.

H. If a Licensee or denturist is found to not be in compliance with the continuing dental education requirements, the Board may take any disciplinary or non-disciplinary action authorized by A.R.S. Title 32, Chapter 11.

#### **Historical Note**

Adopted effective May 21, 1982 (Supp. 82-3). Former Section R4-11-1202 renumbered to R4-11-802, new Section R4-11-1202 renumbered from R4-11-1403 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 21 A.A.R. 921, effective August 3, 2015 (Supp. 15-2). Amended by final rulemaking at 28 A.A.R. 344 (February 4, 2022), effective March 14, 2022 (Supp. 22-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1203. Dentists and Dental Consultants**

Dentists and dental consultants shall complete 63 hours of Recognized Continuing Dental Education in each renewal period as follows:

1. At least 36 Credit Hours in any one or more of the following areas: Dental and medical health, preventive services, dental diagnosis and treatment planning, dental recordkeeping, dental clinical procedures, managing medical emergencies, pain management, dental public health, and courses in corrective and restorative oral health and basic dental sciences, which may include current research, new concepts in dentistry, chemical dependency, tobacco cessation, and behavioral and biological sciences that are oriented to dentistry. A Licensee who holds a permit to administer General Anesthesia, Deep Sedation, Parenteral Sedation, or Oral Sedation who is required to obtain continuing education pursuant to Article 13 may apply those Credit Hours to the requirements of this Section;
2. No more than 15 Credit Hours in one or more of the following areas: Dental practice organization and management, patient management skills, and methods of health care delivery;
3. At least three Credit Hours in opioid education;
4. At least three Credit Hours in infectious diseases or infectious disease control;
5. At least three Credit Hours in cardiopulmonary resuscitation healthcare provider level, advanced cardiac life support or pediatric advanced life support. Coursework may be completed online if the course requires a physical demonstration of skills; and
6. At least three Credit Hours in ethics or Arizona dental jurisprudence.

#### **Historical Note**

Adopted effective September 12, 1985 (Supp. 85-5). Repealed effective July 21, 1995 (Supp. 95-3). New Section R4-11-1203 renumbered from R4-11-1404 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1204. Dental Hygienists**

A. A dental hygienist shall complete 45 Credit Hours of Recognized Continuing Dental Education in each renewal period as follows:

1. At least 25 Credit Hours in any one or more of the following areas: Dental and medical health, and dental hygiene services, periodontal disease, care of implants, maintenance of cosmetic restorations and sealants, radiology safety and techniques, managing medical emergencies,



pain management, dental recordkeeping, dental public health, and new concepts in dental hygiene;

2. No more than 11 Credit Hours in one or more of the following areas: Dental hygiene practice organization and management, patient management skills, and methods of health care delivery;
3. At least three Credit Hours in one or more of the following areas: chemical dependency, tobacco cessation, ethics, risk management, or Arizona dental jurisprudence;
4. At least three Credit Hours in infectious diseases or infectious disease control; and
5. At least three Credit Hours in cardiopulmonary resuscitation healthcare provider level, advanced cardiac life support and pediatric advanced life support. Coursework may be completed online if the course re-quires a physical demonstration of skills.

B. A Licensee who performs dental hygiene services under an affiliated practice relationship who is required to obtain continuing education under R4-11-609 may apply those Credit Hours to the requirements of this Section.

#### **Historical Note**

New Section R4-11-1204 renumbered from R4-11-1405 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 962, effective May 5, 2007 (Supp. 07-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1205. Denturists**

Denturists shall complete 27 Credit Hours of Recognized Continuing Dental Education in each renewal period as follows:

1. At least 15 Credit Hours in any one or more of the following areas: Medical and dental health, laboratory procedures, clinical procedures, dental recordkeeping, removable prosthetics, pain management, dental public health, and new technology in dentistry;
2. No more than three Credit Hours in one or more of the following areas: Denturist practice organization and management, patient management skills, and methods of health care delivery;
3. At least one Credit Hour in chemical dependency, which may include tobacco cessation;
4. At least two Credit Hours in infectious diseases or infectious disease control;
5. At least three Credit Hours in cardiopulmonary resuscitation healthcare provider level, advanced cardiac life support and pediatric advanced life support. Coursework may be completed online if the course re-quires a physical demonstration of skills; and
6. At least three Credit Hours in ethics or Arizona dental jurisprudence.

#### **Historical Note**

New Section R4-11-1205 renumbered from R4-11-1406 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1206. Restricted Permit Holders - Dental**

In addition to the requirements in R4-11-1202, a dental Restricted Permit Holder shall comply with the following requirements:

1. When applying for renewal under A.R.S. § 32-1238, the Restricted Permit Holder shall provide information to the Board that the Restricted Permit Holder has completed 15 Credit Hours of Recognized Continuing Dental Education yearly.

2. To determine whether to grant the renewal, the Board shall only consider Recognized Continuing Dental Education credits accrued during the 36 months immediately before the renewal deadline prescribed in A.R.S. § 32-1236.
3. A dental Restricted Permit Holder shall complete the 15 hours of Recognized Continuing Dental Education before renewal as follows:
  - a. At least six Credit Hours in one or more of the subjects enumerated in R4-11-1203(1);
  - b. No more than three Credit Hours in one or more of the subjects enumerated in R4-11-1203(2);
  - c. At least one Credit Hour in the subjects enumerated in R4-11-1203(3);
  - d. At least one Credit Hour in the subjects enumerated in R4-11-1203(4).
  - e. At least three Credit Hours in the subjects enumerated in R4-11-1203(5); and
  - f. At least one Credit Hour in the subjects enumerated in R4-11-1203(6).

#### **Historical Note**

New Section R4-11-1206 renumbered from R4-11-1407 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R. 344 (February 4, 2022), effective March 14, 2022 (Supp. 22-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1207. Restricted Permit Holders - Dental Hygiene**

In addition to the requirements in R4-11-1202, a dental hygiene Restricted Permit Holder shall comply with the following:

1. When applying for renewal under A.R.S. § 32-1292, the Restricted Permit Holder shall provide information to the Board that the Restricted Permit Holder has completed nine Credit Hours of Recognized Continuing Dental Education yearly.
2. To determine whether to grant renewal, the Board shall only consider Recognized Continuing Dental Education credits accrued during the 36 months immediately before the renewal deadline prescribed in A.R.S. § 32-1287.
3. A dental hygiene Restricted Permit Holder shall complete the nine hours of Recognized Continuing Dental Education before renewal as follows:
  - a. At least three Credit Hours in one or more of the subjects enumerated in R4-11-1204(1);
  - b. No more than three Credit Hours in one or more of the subjects enumerated in R4-11-1204(2);
  - c. At least one Credit Hour in the subjects enumerated in R4-11-1204(3);
  - d. At least two Credit Hours in the subjects enumerated in R4-11-1204(4) and
  - e. At least three Credit Hours in the subjects enumerated in R4-11-1204(5).

#### **Historical Note**

New Section R4-11-1207 renumbered from R4-11-1408 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R. 344 (February 4, 2022), effective March 14, 2022 (Supp. 22-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1208. Retired Licensees or Retired Denturists**

A Retired Licensee or Retired dentist shall:

1. Except for the number of Credit Hours required, comply with the requirements in R4-11-1202; and

2. When applying for renewal under A.R.S. § 32-1236 for a dentist, A.R.S. § 32-1276.02 for a dental therapist, A.R.S. § 32-1287 for a dental hygienist, and A.R.S. § 32-1297.06 for a denturist, provide information to the Board that the Retired Licensee or Retired denturist has completed the following Credit Hours of Recognized Continuing Dental Education per renewal period:
  - a. Dentist – 24 Credit Hours of which no less than three credit hours shall be for cardiopulmonary resuscitation-healthcare provider level;
  - b. Dental therapist - 21 Credit Hours of which no less than three Credit Hours shall be for cardiopulmonary resuscitation- healthcare provider level;
  - c. Dental hygienist - 18 Credit Hours of which no less than three credit hours shall be for cardiopulmonary resuscitation-healthcare provider level; and
  - d. Denturist – six Credit Hours of which no less than three credit hours shall be for cardiopulmonary resuscitation-healthcare provider level.

#### **Historical Note**

New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1209. Types of Courses**

A. A Licensee or denturist shall obtain Recognized Continuing Dental Education from one or more of the following activities:

1. Seminars, symposiums, lectures, or programs designed to provide an understanding of current developments, skills, procedures, or treatment related to the practice of dentistry;
2. Seminars, symposiums, lectures, or programs designed to provide an understanding of current developments, skills, procedures, or treatment related to the practice of dentistry by means of audio-video technology in which the Licensee is provided all seminar, symposium, lecture or program materials and the technology permits attendees to fully participate; or
3. Curricula designed to prepare for specialty board certification as a specialist or recertification examinations or advanced training at an accredited institution as defined in A.R.S. Title 32, Chapter 11; and
4. Subject to the limitations in subsection (B), any of the following activities that provide an understanding of current developments, skills, procedures, or treatment related to the practice of dentistry:
  - a. A correspondence course, video, internet or similar self-study course, if the course includes an examination and the Licensee or denturist passes the examination;
  - b. Participation on the Board, in Board complaint investigations including Clinical Evaluations or anesthesia and sedation permit evaluations;
  - c. Participation in peer review of a national or state dental, dental therapy, dental hygiene, or denturist association or participation in quality of care or utilization review in a hospital, institution, or governmental agency;
  - d. Providing dental-related instruction to dental, dental therapy, dental hygiene, or denturist students, or allied health professionals in a recognized dental school, recognized dental therapy school, recognized dental hygiene school, or recognized denturist school or providing dental-related instruction sponsored by a national, state, or local dental, dental therapy, dental hygiene, or denturist association;
  - e. Publication or presentation of a dental paper, report, or book authored by the Licensee or denturist that provides information on current developments, skills, procedures, or treatment related to the practice of dentistry. A Licensee or denturist may claim Credit Hours:
    - i. Only once for materials presented;
    - ii. Only if the date of publication or original presentation was during the applicable renewal period; and
    - iii. One Credit Hour for each hour of preparation, writing, and presentation; or

- f. Providing dental, dental therapy, dental hygiene, or denturist services in a Board-recognized Charitable Dental Clinic or Organization.
- B. The following limitations apply to the total number of Credit Hours earned per renewal period in any combination of the activities listed in subsection (A)(4):
1. Dentists no more than 21 hours;
  2. Dental therapists, no more than 18 hours;
  3. Dental hygienists, no more than 15 hours;
  4. Denturists, no more than nine hours;
  5. Retired or Restricted Permit Holder dentists, dental therapists, or dental hygienists, no more than two hours; and
  6. Retired denturists, no more than two hours.

**Historical Note**

New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 3873, effective January 5, 2014 (Supp. 13-4). Amended by final rulemaking at 28 A.A.R.1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

**ARTICLE 13. GENERAL ANESTHESIA AND SEDATION**

**R4-11-1301. General Anesthesia and Deep Sedation**

A. Before administering General Anesthesia, or Deep Sedation by any means, in a dental office or dental clinic, a dentist shall possess a Section 1301 Permit issued by the Board. The dentist may renew a Section 1301 Permit every five years by complying with R4-11-1307.

B. To obtain or renew a Section 1301 Permit, a dentist shall:

1. Submit a completed application on a form provided by the Board office that, in addition to the requirements of subsections (B)(2) and (3), and R4-11-1307, includes:
  - a. General information about the applicant such as:
    - i. Name;
    - ii. Home and office addresses and telephone numbers;
    - iii. Limitations of practice;
    - iv. Hospital affiliations;
    - v. Denial, curtailment, revocation, or suspension of hospital privileges;
    - vi. Denial of membership in, denial of renewal of membership in, or disciplinary action by a dental organization; and
    - vii. Denial of licensure by, denial of renewal of licensure by, or disciplinary action by a dental regulatory body; and
  - b. The dentist's dated and signed affidavit stating that the information provided is true, and that the dentist has read and complied with the Board's statutes and rules;
2. On forms provided by the Board, provide a dated and signed affidavit attesting that any office or dental clinic where the dentist will administer General Anesthesia or Deep Sedation:
  - a. Contains the following properly operating equipment and supplies during the provision of General Anesthesia and Deep Sedation:
    - i. Emergency Drugs;
    - ii. Electrocardiograph monitor;
    - iii. Pulse oximeter;
    - iv. Cardiac defibrillator or automated external defibrillator;
    - v. Positive pressure oxygen and supplemental oxygen;
    - vi. Suction equipment, including endotracheal, tonsillar, or pharyngeal and emergency backup medical suction device;
    - vii. Laryngoscope, multiple blades, backup batteries, and backup bulbs;
    - viii. Endotracheal tubes and appropriate connectors;
    - ix. Magill forceps;
    - x. Oropharyngeal and nasopharyngeal airways;
    - xi. Auxiliary lighting;

- xii. Stethoscope; and
      - xiii. Blood pressure monitoring device; and
    - b. Maintains a staff of supervised personnel capable of handling procedures, complications, and emergency incidents. All personnel involved in administering and monitoring General Anesthesia or Deep Sedation shall hold a current course completion confirmation in cardiopulmonary resuscitation healthcare provider level;
  - 3. Hold a valid license to practice dentistry in this state;
  - 4. Maintain a current permit to prescribe and administer Controlled Substances in this state issued by the United States Drug Enforcement Administration; and
  - 5. Provide confirmation of completing coursework within the two years prior to submitting the permit application in one or more of the following:
    - a. Advanced cardiac life support from the American Heart Association or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
    - b. Pediatric advanced life support in a practice treating pediatric patients; or
    - c. A recognized continuing education course in advanced airway management.
- C. Initial applicants shall meet one or more of the following conditions by submitting to the Board verification of meeting the condition directly from the issuing institution:
  - 1. Complete, within the three years before submitting the permit application, a full credit load, as defined by the training program, during one calendar year of training, in anesthesiology or related academic subjects, beyond the undergraduate dental school level in a training program described in R4-11-1306(A), offered by a hospital accredited by the Joint Commission on Accreditation of Hospitals Organization, or sponsored by a university accredited by the American Dental Association Commission on Dental Accreditation;
  - 2. Be, within the three years before submitting the permit application, a Diplomate of the American Board of Oral and Maxillofacial Surgeons or eligible for examination by the American Board of Oral and Maxillofacial surgeons, a Fellow of the American Association of Oral and Maxillofacial surgeons, a Fellow of the American Dental Society of Anesthesiology, a Diplomate of the National Dental Board of Anesthesiology, or a Diplomate of the American Dental Board of Anesthesiology; or
  - 3. For an applicant who completed the requirements of subsections (C)(1) or (C)(2) more than three years before submitting the permit application, provide the following documentation:
    - a. On a form provided by the Board, a written affidavit affirming that the applicant has administered General Anesthesia or Deep Sedation to a minimum of 25 patients within the year before submitting the permit application or 75 patients within the last five years before submitting the permit application;
    - b. A copy of the General Anesthesia or Deep Sedation permit in effect in another state or certification of military training in General Anesthesia or Deep Sedation from the applicant's commanding officer; and
    - c. On a form provided by the Board, a written affidavit affirming the completion of 30 clock hours of continuing education taken within the last five years as outlined in R4-11-1306(B)(1)(a) through (f).
- D. After submitting the application and written evidence of compliance with requirements in subsection (B) and, if applicable, subsection (C) to the Board, the applicant shall schedule an onsite evaluation by the Board during which the applicant shall administer General Anesthesia or Deep Sedation. After the applicant completes the application requirements and successfully completes the onsite evaluation, a Section 1301 Permit shall be issued to the applicant.
  - 1. The onsite evaluation team shall consist of:
    - a. Two dentists who are Board members, or Board designees for initial applications; or
    - b. One dentist who is a Board member or Board designee for renewal applications.
  - 2. The onsite team shall evaluate the following:
    - a. The availability of equipment and personnel as specified in subsection (B)(2);

- b. Proper administration of General Anesthesia or Deep Sedation to a patient by the applicant in the presence of the evaluation team;
  - c. Successful responses by the applicant to oral examination questions from the evaluation team about patient management, medical emergencies, and emergency medications;
  - d. Proper documentation of Controlled Substances, that includes a perpetual inventory log showing the receipt, administration, dispensing, and destruction of Controlled Substances;
  - e. Proper recordkeeping as specified in subsection (E) by reviewing the records generated for the patient specified in subsection (D)(2)(b); and
  - f. For renewal applicants, records supporting continued competency as specified in R4-11-1306.
3. The evaluation team shall recommend one of the following:
- a. Pass. Successful completion of the onsite evaluation;
  - b. Conditional Approval for failing to have appropriate equipment, proper documentation of Controlled Substances, or proper recordkeeping. The applicant must submit proof of correcting the deficiencies before a permit is issued;
  - c. Category 1 Evaluation Failure. The applicant must review the appropriate subject matter and schedule a subsequent evaluation by two Board Members or Board designees not less than 30 days from the failed evaluation. An example is failure to recognize and manage one emergency;
  - d. Category 2 Evaluation Failure. The applicant must complete Board approved continuing education in subject matter within the scope of the onsite evaluation as identified by the evaluators and schedule a subsequent evaluation by two Board Members or Board designees not less than 60 days from the failed evaluation. An example is failure to recognize and manage more than one emergency; or
  - e. Category 3 Evaluation Failure. The applicant must complete Board approved remedial continuing education with the subject matter outlined in R4-11- 1306 as identified by the evaluators and reapply not less than 90 days from the failed evaluation. An example is failure to recognize and manage an anesthetic urgency.
4. The onsite evaluation of an additional dental office or dental clinic in which General Anesthesia or Deep Sedation is administered by an existing Section 1301 Permit holder may be waived by the Board staff upon receipt in the Board office of an affidavit verifying compliance with subsection (D)(2)(a).
5. A Section 1301 mobile permit may be issued if a Section 1301 Permit holder travels to dental offices or dental clinics to provide anesthesia or Deep Sedation. The applicant must submit a completed affidavit verifying:
- a. That the equipment and supplies for the provision of anesthesia or Deep Sedation as required in subsection (B)(2)(a) either travel with the Section 1301 Permit holder or are in place and in appropriate condition at the dental office or dental clinic where anesthesia or Deep Sedation is provided, and
  - b. Compliance with subsection (B)(2)(b).
- E. A Section 1301 Permit holder shall keep an anesthesia or Deep Sedation record for each General Anesthesia and Deep Sedation procedure that includes the following entries:
- 1. Pre-operative and post-operative electrocardiograph documentation;
  - 2. Pre-operative, intra-operative, and post-operative pulse oximeter documentation;
  - 3. Pre-operative, intra-operative, and post-operative blood pressure and vital sign documentation;
  - 4. A list of all medications given, with dosage and time intervals, and route and site of administration;
  - 5. Type of catheter or portal with gauge;
  - 6. Indicate nothing by mouth or time of last intake of food or water;
  - 7. Consent form; and

8. Time of discharge and status, including name of escort.
- F. The Section 1301 Permit holder, for intravenous access, shall use a new infusion set, including a new infusion line and new bag of fluid, for each patient.
- G. The Section 1301 Permit holder shall utilize supplemental oxygen for patients receiving General Anesthesia or Deep Sedation for the duration of the procedure.
- H. The Section 1301 Permit holder shall continuously supervise the patient from the initiation of anesthesia or Deep Sedation until termination of the anesthesia or Deep Sedation procedure and oxygenation, ventilation, and circulation are stable. The Section 1301 Permit holder shall not commence with the administration of a subsequent anesthetic case until the patient is in monitored recovery or meets the guidelines for discharge.
- I. A Section 1301 Permit holder may employ the following health care professionals to provide anesthesia or sedation services and shall ensure that the health care professional continuously supervises the patient from the administration of anesthesia or sedation until termination of the anesthesia or sedation procedure and oxygenation, ventilation, and circulation are stable:
  1. An allopathic or osteopathic physician currently licensed in Arizona by the Arizona Medical Board or the Arizona Board of Osteopathic Examiners who has successfully completed a residency program in anesthesiology approved by the American Council on Graduate Medical Education or the American Osteopathic Association or who is certified by either the American Board of Anesthesiology or the American Osteopathic Board of Anesthesiology and is credentialed with anesthesia privileges through an Arizona licensed medical facility, or
  2. A Certified Registered Nurse Anesthetist currently licensed in Arizona who provides services under the Nurse Practice Act in A.R.S. Title 32, Chapter 15.
- J. A Section 1301 Permit holder may also administer parenteral sedation without obtaining a Section 1302 Permit.

#### **Historical Note**

New Section R4-11-1301 renumbered from R4-11-802 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1302. Parenteral Sedation**

- A. Before administering parenteral sedation in a dental office or dental clinic, a dentist shall possess a Section 1302 Permit issued by the Board. The dentist may renew a Section 1302 permit every five years by complying with R4-11-1307.
  1. A Section 1301 Permit holder may also administer parenteral sedation.
  2. A Section 1302 Permit holder shall not administer or employ any agents which have a narrow margin for maintaining consciousness including, but not limited to, ultrashort acting barbiturates, propofol, parenteral ketamine, or similarly acting Drugs, agents, or techniques, or any combination thereof that would likely render a patient deeply sedated, generally anesthetized or otherwise not meeting the conditions of Moderate Sedation.
- B. To obtain or renew a Section 1302 Permit, the dentist shall:
  1. Submit a completed application on a form provided by the Board office that, in addition to the requirements of subsections (B)(2) and (3) and R4-11-1307, includes:
    - a. General information about the applicant such as:
      - i. Name;
      - ii. Home and office addresses and telephone numbers;
      - iii. Limitations of practice;
      - iv. Hospital affiliations;
      - v. Denial, curtailment, revocation, or suspension of hospital privileges;
      - vi. Denial of membership in, denial of renewal of membership in, or disciplinary action by a dental organization; and

- vii. Denial of licensure by, denial of renewal of licensure by, or disciplinary action by a dental regulatory body; and
    - b. The dentist's dated and signed affidavit stating that the information provided is true, and that the dentist has read and complied with the Board's statutes and rules;
  - 2. On forms provided by the Board, provide a dated and signed affidavit attesting that any dental office or dental clinic where the dentist will administer parenteral sedation by intravenous or intramuscular route:
    - a. Contains the following properly operating equipment and supplies during the provision of parenteral sedation by the permit holder or General Anesthesia or Deep Sedation by a physician anesthesiologist or Certified Registered Nurse Anesthetist:
      - i. Emergency Drugs;
      - ii. Positive pressure oxygen and supplemental oxygen;
      - iii. Stethoscope;
      - iv. Suction equipment, including tonsillar or pharyngeal and emergency backup medical suction device;
      - v. Oropharyngeal and nasopharyngeal airways;
      - vi. Pulse oximeter;
      - vii. Auxiliary lighting;
      - viii. Blood pressure monitoring device; and
      - ix. Cardiac defibrillator or automated external defibrillator; and
    - b. Maintains a staff of supervised personnel capable of handling procedures, complications, and emergency incidents, including at least one staff member who:
      - i. Holds a current course completion confirmation in cardiopulmonary resuscitation health care provider level;
      - ii. Is present during the parenteral sedation procedure; and
      - iii. After the procedure, monitors the patient until discharge;
  - 3. Hold a valid license to practice dentistry in this state;
  - 4. Maintain a current permit to prescribe and administer Controlled Substances in this state issued by the United States Drug Enforcement Administration;
  - 5. Provide confirmation of completing coursework within the two years prior to submitting the permit application in one or more of the following:
    - a. Advanced cardiac life support from the American Heart Association or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
    - b. Pediatric advanced life support in a practice treating pediatric patients; or
    - c. A recognized continuing education course in advanced airway management.
- C. Initial applicants shall meet one of the following conditions:
1. Successfully complete Board-recognized undergraduate, graduate, or postgraduate education within the three years before submitting the permit application, that includes the following:
    - a. Sixty didactic hours of basic parenteral sedation to include:
      - i. Physical evaluation;
      - ii. Management of medical emergencies;
      - iii. The importance of and techniques for maintaining proper documentation; and
      - iv. Monitoring and the use of monitoring equipment; and
    - b. Hands-on administration of parenteral sedative medications to at least 20 patients in a manner consistent with this Section; or
  2. An applicant who completed training in parenteral sedation more than three years before submitting the permit application shall provide the following documentation:
    - a. On a form provided by the Board, a written affidavit affirming that the applicant has administered parenteral sedation to a minimum of 25 patients within the year or 75 patients within the last five years before submitting the permit application;



- b. A copy of the parenteral sedation permit in effect in another state or certification of military training in parenteral sedation from the applicant's commanding officer; and
  - c. On a form provided by the Board, a written affidavit affirming the completion of 30 clock hours of continuing education taken within the last five years as outlined in R4-11-1306(B)(1)(b) through (f).
- D. After submitting the application and written evidence of compliance with requirements outlined in subsection (B) and, if applicable, subsection (C) to the Board, the applicant shall schedule an onsite evaluation by the Board during which the applicant shall administer parenteral sedation. After the applicant completes the application requirements and successfully completes the onsite evaluation, the Board shall issue a Section 1302 Permit to the applicant.
1. The onsite evaluation team shall consist of:
    - a. Two dentists who are Board members, or Board designees for initial applications, or
    - b. One dentist who is a Board member or Board designee for renewal applications.
  2. The onsite team shall evaluate the following:
    - a. The availability of equipment and personnel as specified in subsection (B)(2);
    - b. Proper administration of parenteral sedation to a patient by the applicant in the presence of the evaluation team;
    - c. Successful responses by the applicant to oral examination questions from the evaluation team about patient management, medical emergencies, and emergency medications;
    - d. Proper documentation of Controlled Substances, that includes a perpetual inventory log showing the receipt, administration, dispensing, and destruction of all Controlled Substances;
    - e. Proper recordkeeping as specified in subsection (E) by reviewing the records generated for the patient receiving parenteral sedation as specified in subsection (D)(2)(b); and
    - f. For renewal applicants, records supporting continued competency as specified in R4-11-1306.
  3. The evaluation team shall recommend one of the following:
    - a. Pass. Successful completion of the onsite evaluation;
    - b. Conditional Approval for failing to have appropriate equipment, proper documentation of Controlled Substances, or proper recordkeeping. The applicant must submit proof of correcting the deficiencies before a permit is issued;
    - c. Category 1 Evaluation Failure. The applicant must review the appropriate subject matter and schedule a subsequent evaluation by two Board Members or Board designees not less than 30 days from the failed evaluation. An example is failure to recognize and manage one emergency;
    - d. Category 2 Evaluation Failure. The applicant must complete Board approved continuing education in subject matter within the scope of the onsite evaluation as identified by the evaluators and schedule a subsequent evaluation by two Board Members or Board designees not less than 60 days from the failed evaluation. An example is failure to recognize and manage more than one emergency; or
    - e. Category 3 Evaluation Failure. The applicant must complete Board approved remedial continuing education with the subject matter outlined in R4-11-1306 as identified by the evaluators and reapply not less than 90 days from the failed evaluation. An example is failure to recognize and manage an anesthetic urgency.
  4. The onsite evaluation of an additional dental office or dental clinic in which parenteral sedation is administered by an existing Section 1302 Permit holder may be waived by the Board staff upon receipt in the Board office of an affidavit verifying compliance with subsection (D)(2)(a).
  5. A Section 1302 mobile permit may be issued if a Section 1302 Permit holder travels to dental offices or dental clinics to provide parenteral sedation. The applicant must submit a completed affidavit verifying:

- a. That the equipment and supplies for the provision of parenteral sedation as required in R4-11-1302(B)(2)(a) either travel with the Section 1302 Permit holder or are in place and in appropriate working condition at the dental office or dental clinic where parenteral sedation is provided, and
  - b. Compliance with R4-11-1302(B)(2)(b).
- E. A Section 1302 Permit holder shall keep a parenteral sedation record for each parenteral sedation procedure that:
- 1. Includes the following entries:
    - a. Pre-operative, intra-operative, and post-operative pulse oximeter documentation;
    - b. Pre-operative, intra-operative, and post-operative blood pressure and vital sign documentation;
    - c. A list of all medications given, with dosage and time intervals and route and site of administration;
    - d. Type of catheter or portal with gauge;
    - e. Indicate nothing by mouth or time of last intake of food or water;
    - f. Consent form; and
    - g. Time of discharge and status, including name of escort; and
  - 2. May include pre-operative and post-operative electrocardiograph report.
- F. The Section 1302 Permit holder shall establish intravenous access on each patient receiving parenteral sedation utilizing a new infusion set, including a new infusion line and new bag of fluid.
- G. The Section 1302 Permit holder shall utilize supplemental oxygen for patients receiving parenteral sedation for the duration of the procedure.
- H. The Section 1302 Permit holder shall continuously supervise the patient from the initiation of parenteral sedation until termination of the parenteral sedation procedure and oxygenation, ventilation and circulation are stable. The Section 1302 Permit holder shall not commence with the administration of a subsequent anesthetic case until the patient is in monitored recovery or meets the guidelines for discharge.
- I. A Section 1302 Permit holder may employ a health care professional as specified in R4-11-1301(I).

#### **Historical Note**

New Section R4-11-1302 renumbered from R4-11-803 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1303. Oral Sedation**

- A. Before administering Oral Sedation in a dental office or dental clinic, a dentist shall possess a Section 1303 Permit issued by the Board. The dentist may renew a Section 1303 Permit every five years by complying with R4-11-1307.
- 1. A Section 1301 Permit holder or Section 1302 Permit holder may also administer Oral Sedation without obtaining a Section 1303 Permit.
  - 2. The administration of a single Drug for Minimal Sedation does not require a Section 1303 Permit if:
    - a. The administered dose is within the Food and Drug Administration's maximum recommended dose as printed in the Food and Drug Administration's approved labeling for unmonitored home use;
      - i. Incremental multiple doses of the Drug may be administered until the desired effect is reached, but does not exceed the maximum recommended dose; and
      - ii. During Minimal Sedation, a single supplemental dose may be administered. The supplemental dose may not exceed one-half of the initial dose and the total aggregate dose may not exceed one and one-half times the Food and Drug Administration's maximum recommended dose on the date of treatment; and
    - b. Nitrous oxide/oxygen may be administered in addition to the oral Drug as long as the

- 
- combination does not exceed Minimal Sedation.
- B. To obtain or renew a Section 1303 Permit, a dentist shall:
1. Submit a completed application on a form provided by the Board office that, in addition to the requirements of subsections (B)(2) and (3) and R4-11-1307, includes:
    - a. General information about the applicant such as:
      - i. Name;
      - ii. Home and office addresses and telephone numbers;
      - iii. Limitations of practice;
      - iv. Hospital affiliations;
      - v. Denial, curtailment, revocation, or suspension of hospital privileges;
      - vi. Denial of membership in, denial of renewal of membership in, or disciplinary action by a dental organization; and
      - vii. Denial of licensure by, denial of renewal of licensure by, or disciplinary action by a dental regulatory body; and
    - b. The dentist's dated and signed affidavit stating that the information provided is true, and that the dentist has read and complied with the Board's statutes and rules;
  2. On forms provided by the Board, provide a dated and signed affidavit attesting that any dental office or dental clinic where the dentist will administer Oral Sedation:
    - a. Contains the following properly operating equipment and supplies during the provision of sedation:
      - i. Emergency Drugs;
      - ii. Cardiac defibrillator or automated external defibrillator;
      - iii. Positive pressure oxygen and supplemental oxygen;
      - iv. Stethoscope;
      - v. Suction equipment, including tonsillar or pharyngeal and emergency backup medical suction device;
      - vi. Pulse oximeter;
      - vii. Blood pressure monitoring device; and
      - viii. Auxiliary lighting; and
    - b. Maintains a staff of supervised personnel capable of handling procedures, complications, and emergency incidents, including at least one staff member who:
      - i. Holds a current certificate in cardiopulmonary resuscitation healthcare provider level;
      - ii. Is present during the Oral Sedation procedure; and
      - iii. After the procedure, monitors the patient until discharge;
  3. Hold a valid license to practice dentistry in this state;
  4. Maintain a current permit to prescribe and administer Controlled Substances in this state issued by the United States Drug Enforcement Administration;
  5. Provide confirmation of completing coursework within the two years prior to submitting the permit application in one or more of the following:
    - a. Cardiopulmonary resuscitation healthcare provider level from the American Heart Association, American Red Cross, or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association or American Red Cross;
    - b. Pediatric advanced life support in a practice treating pediatric patients; or
    - c. A recognized continuing education course in advanced airway management.
- C. Initial applicants shall meet one of the following by submitting to the Board verification of meeting the condition directly from the issuing institution:
1. Complete a Board-recognized post-doctoral residency program that includes documented training in Oral Sedation within the last three years before submitting the permit application; or
  2. Complete a Board recognized post-doctoral residency program that includes documented training in Oral Sedation more than three years before submitting the permit application shall provide the following documentation:
    - a. On a form provided by the Board, a written affidavit affirming that the applicant has administered Oral Sedation to a minimum of 25 patients within the year or 75 patients within the last five years before submitting the permit application;

- 
- b. A copy of the Oral Sedation permit in effect in another state or certification of military training in Oral Sedation from the applicant's commanding officer; and
      - c. On a form provided by the Board, a written affidavit affirming the completion of 30 hours of continuing education taken within the last five years as outlined in R4-11-1306(C)(1)(a) through (f); or
    3. Provide proof of participation in 30 clock hours of Board- recognized undergraduate, graduate, or post-graduate education in Oral Sedation within the three years before submitting the permit application that includes:
      - a. Training in basic Oral Sedation,
      - b. Pharmacology,
      - c. Physical evaluation,
      - d. Management of medical emergencies,
      - e. The importance of and techniques for maintaining proper documentation, and
      - f. Monitoring and the use of monitoring equipment.
  - D. After submitting the application and written evidence of compliance with requirements in subsection (B) and, if applicable, subsection (C) to the Board, the applicant shall schedule an onsite evaluation by the Board. After the applicant completes the application requirements and successfully completes the onsite evaluation, the Board shall issue a Section 1303 Permit to the applicant.
    1. The onsite evaluation team shall consist of:
      - a. For initial applications, two dentists who are Board members, or Board designees.
      - b. For renewal applications, one dentist who is a Board member, or Board designee.
    2. The onsite team shall evaluate the following:
      - a. The availability of equipment and personnel as specified in subsection (B)(2);
      - b. Successful responses by the applicant to oral examination questions from the evaluation team about patient management, medical emergencies, and emergency medications;
      - c. Proper documentation of Controlled Substances, that includes a perpetual inventory log showing the receipt, administration, dispensing, and destruction of Controlled Substances;
      - d. Proper recordkeeping as specified in subsection (E) by reviewing the forms that document the Oral Sedation record; and
      - e. For renewal applicants, records supporting continued competency as specified in R4-11-1306.
    3. The evaluation team shall recommend one of the following:
      - a. Pass. Successful completion of the onsite evaluation;
      - b. Conditional Approval for failing to have appropriate equipment, proper documentation of Controlled Substance, or proper recordkeeping. The applicant must submit proof of correcting the deficiencies before permit will be issued;
      - c. Category 1 Evaluation Failure. The applicant must review the appropriate subject matter and schedule a subsequent evaluation by two Board Members or Board designees not less than 30 days from the failed evaluation. An example is failure to recognize and manage one emergency; or
      - d. Category 2 Evaluation Failure. The applicant must complete Board approved continuing education in subject matter within the scope of the onsite evaluation as identified by the evaluators and schedule a subsequent evaluation by two Board Members or Board designees not less than 60 days from the failed evaluation. An example is failure to recognize and manage more than one emergency.
    4. The onsite evaluation of an additional dental office or dental clinic in which Oral Sedation is administered by a Section 1303 Permit holder may be waived by the Board staff upon receipt in the Board office of an affidavit verifying compliance with subsection (D)(2)(a).
    5. A Section 1303 mobile permit may be issued if the Section 1303 Permit holder travels to dental offices or dental clinics to provide Oral Sedation. The applicant must submit a completed affidavit verifying:
      - a. That the equipment and supplies for the provision of Oral Sedation as required in R4-11-1303(B)(2)(a) either travel with the Section 1303 Permit holder or are in place and

- in appropriate condition at the dental office or dental clinic where Oral Sedation is provided, and
- b. Compliance with R4-11-1303(B)(2)(b).
- E. A Section 1303 Permit holder shall keep an Oral Sedation record for each Oral Sedation procedure that:
1. Includes the following entries:
    - a. Pre-operative, intra-operative, and post-operative, pulse oximeter oxygen saturation and pulse rate documentation;
    - b. Pre-operative and post-operative blood pressure;
    - c. Documented reasons for not taking vital signs if a patient's behavior or emotional state prevents monitoring personnel from taking vital signs;
    - d. List of all medications given, including dosage and time intervals;
    - e. Patient's weight;
    - f. Consent form;
    - g. Special notes, such as, nothing by mouth or last intake of food or water; and
    - h. Time of discharge and status, including name of escort; and
  2. May include the following entries:
    - a. Pre-operative and post-operative electrocardiograph report; and
    - b. Intra-operative blood pressures.
- F. The Section 1303 Permit holder shall utilize supplemental oxygen for patients receiving Oral Sedation for the duration of the procedure.
- G. The Section 1303 Permit holder shall ensure the continuous supervision of the patient from the administration of Oral Sedation until oxygenation, ventilation and circulation are stable and the patient is appropriately responsive for discharge from the dental office or dental clinic.
- H. A Section 1303 Permit holder may employ a health care professional to provide anesthesia services, if all of the following conditions are met:
1. The physician anesthesiologist or Certified Registered Nurse Anesthetist meets the requirements as specified in R4-11-1301(I);
  2. The Section 1303 Permit holder has completed course- work within the two years prior to submitting the permit application in one or more of the following:
    - a. Advanced cardiac life support from the American Heart Association or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
    - b. Pediatric advanced life support in a practice treating pediatric patients;
    - c. A recognized continuing education course in advanced airway management;
  3. The Section 1303 Permit holder ensures that:
    - a. The dental office or clinic contains the equipment and supplies listed in R4-11-1304(B)(2)(a) during the provision of anesthesia or sedation by the physician anesthesiologist or Certified Registered Nurse Anesthetist;
    - b. The anesthesia or sedation record contains all the entries listed in R4-11-1304(D);
    - c. For intravenous access, the physician anesthesiologist or Certified Registered Nurse Anesthetist uses a new infusion set, including a new infusion line and new bag of fluid for each patient; and
    - d. The patient is continuously supervised from the administration of anesthesia or sedation until the termination of the anesthesia or sedation procedure and oxygenation, ventilation and circulation are stable. The Section 1303 Permit holder shall not commence with a subsequent procedure or treatment until the patient is in monitored recovery or meets the guide- lines for discharge.

#### **Historical Note**

New Section R4-11-1303 renumbered from R4-11-805 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Former Section R4- 11-1303 renumbered to R4-11-1304; new Section R4-11- 1303 made by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

---

**R4-11-1304. Permit to Employ or Work with a Physician Anesthesiologist or Certified Registered Nurse Anesthetist (CRNA)**

- A. This Section does not apply to a Section 1301 permit holder or a Section 1302 permit holder practicing under the provisions of R4-11-1302(I) or a Section 1303 permit holder practicing under the provisions of R4-11-1303(H). A dentist may utilize a physician anesthesiologist or certified registered nurse anesthetist (CRNA) for anesthesia or sedation services while the dentist provides treatment in the dentist's office or dental clinic after obtaining a Section 1304 permit issued by the Board.
1. The physician anesthesiologist or CRNA meets the requirements as specified in R4-11-1301(I).
  2. The dentist permit holder shall provide all dental treatment and ensure that the physician anesthesiologist or CRNA remains on the dental office or dental clinic premises until any patient receiving anesthesia or sedation services is discharged.
  3. A dentist may renew a Section 1304 permit every five years by complying with R4-11-1307.
- B. To obtain or renew a Section 1304 permit, a dentist shall:
1. Submit a completed application on a form provided by the Board office that, in addition to the requirements of subsections (B)(2) and (3) and R4-11-1307 includes:
    - a. General information about the applicant such as:
      - i. Name;
      - ii. Home and office addresses and telephone numbers;
      - iii. Limitations of practice;
      - iv. Hospital affiliations;
      - v. Denial, curtailment, revocation, or suspension of hospital privileges;
      - vi. Denial of membership in, denial of renewal of membership in, or disciplinary action by a dental organization; and
      - vii. Denial of licensure by, denial of renewal of licensure by, or disciplinary action by a dental regulatory body; and
    - b. The dentist's dated and signed affidavit stating that the information provided is true, and that the dentist has read and complied with the Board's statutes and rules;
  2. On forms provided by the Board, provide a dated and signed affidavit attesting that any dental office or dental clinic where the dentist provides treatment during administration of general anesthesia or sedation by a physician anesthesiologist or CRNA:
    - a. Contains the following properly operating equipment and supplies during the provision of general anesthesia and sedation:
      - i. Emergency drugs;
      - ii. Electrocardiograph monitor;
      - iii. Pulse oximeter;
      - iv. Cardiac defibrillator or automated external defibrillator (AED);
      - v. Positive pressure oxygen and supplemental continuous flow oxygen;
      - vi. Suction equipment, including endotracheal, tonsillar or pharyngeal and emergency backup medical suction device;
      - vii. Laryngoscope, multiple blades, backup batteries and backup bulbs;
      - viii. Endotracheal tubes and appropriate connectors;
      - ix. Magill forceps;
      - x. Oropharyngeal and nasopharyngeal airways;
      - xi. Auxiliary lighting;
      - xii. Stethoscope; and
      - xiii. Blood pressure monitoring device; and
    - b. Maintains a staff of supervised personnel capable of handling procedures, complications, and emergency incidents. All personnel involved in administering and monitoring general anesthesia or sedation shall hold a current course completion confirmation in cardiopulmonary resuscitation (CPR) Health Care Provider level;
  3. Hold a valid license to practice dentistry in this state; and
  4. Provide confirmation of completing coursework within the last two years prior to submitting the permit application in one or more of the following:
    - a. Advanced cardiac life support (ACLS) from the American Heart Association or another

- 
- agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
  - b. Pediatric advanced life support (PALS) in a practice treating pediatric patients;
  - c. A recognized continuing education course in advanced airway management.
- C. After submitting the application and written evidence of compliance with requirements in subsection (B) to the Board, the applicant shall schedule an onsite evaluation by the Board. After the applicant completes the application requirements and successfully completes the onsite evaluation, the Board shall issue the applicant a Section 1304 permit.
- 1. The onsite evaluation team shall consist of one dentist who is a Board member, or Board designee.
  - 2. The onsite team shall evaluate the following:
    - a. The availability of equipment and personnel as specified in subsection (B)(2);
    - b. Proper documentation of controlled substances, that includes a perpetual inventory log showing the receipt, administration, dispensing, and destruction of controlled substances; and
    - c. Proper recordkeeping as specified in subsection (E) by reviewing previous anesthesia or sedation records.
  - 3. The evaluation team shall recommend one of the following:
    - a. Pass. Successful completion of the onsite evaluation; or
    - b. Conditional approval for failing to have appropriate equipment, proper documentation of controlled substances, or proper recordkeeping. The applicant must submit proof of correcting the deficiencies before a permit is issued.
  - 4. The evaluation of an additional dental office or dental clinic in which a Section 1304 permit holder provides treatment during the administration general anesthesia or sedation by a physician anesthesiologist or CRNA may be waived by the Board staff upon receipt in the Board office of an affidavit verifying compliance with subsection (B)(2).
- D. A Section 1304 permit holder shall keep an anesthesia or sedation record for each general anesthesia and sedation procedure that includes the following entries:
- 1. Pre-operative and post-operative electrocardiograph documentation;
  - 2. Pre-operative, intra-operative, and post-operative, pulse oximeter documentation;
  - 3. Pre-operative, intra-operative, and post-operative blood pressure and vital sign documentation; and
  - 4. A list of all medications given, with dosage and time intervals and route and site of administration;
  - 5. Type of catheter or portal with gauge;
  - 6. Indicate nothing by mouth or time of last intake of food or water;
  - 7. Consent form; and
  - 8. Time of discharge and status, including name of escort.
- E. For intravenous access, a Section 1304 permit holder shall ensure that the physician anesthesiologist or CRNA uses a new infusion set, including a new infusion line and new bag of fluid for each patient.
- F. A Section 1304 permit holder shall ensure that the physician anesthesiologist or CRNA utilizes supplemental continuous flow oxygen for patients receiving general anesthesia or sedation for the duration of the procedure.
- G. The Section 1304 permit holder shall continuously supervise the patient from the administration of anesthesia or sedation until termination of the anesthesia or sedation procedure and oxygenation, ventilation and circulation are stable. The Section 1304 permit holder shall not commence with a subsequent procedure or treatment until the patient is in monitored recovery or meets the guidelines for discharge.

#### **Historical Note**

New Section R4-11-1304 renumbered from R4-11-805 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Former Section R4- 11-1304 renumbered to R4-11-1305; new Section R4-11- 1304 renumbered from R4-11-1303 and amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Section repealed; new Section made by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1305. Reports of Adverse Occurrences**

If a death, or incident requiring emergency medical response, occurs in a dental office or dental clinic during the administration of or recovery from general anesthesia, deep sedation, moderate sedation, or minimal sedation, the permit holder and the treating dentist involved shall submit a complete report of the incident to the Board within 10 days after the occurrence.

#### **Historical Note**

New Section R4-11-1305 renumbered from R4-11-806 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Former Section R4- 11-1305 renumbered to R4-11-1306; new Section R4-11- 1305 renumbered from R4-11-1304 and amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Section repealed; new Section made by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1306. Education; Continued Competency**

- A. To obtain a Section 1301, permit by satisfying the education requirement of R4-11-1301(B)(6), a dentist shall successfully complete an advanced graduate or post-graduate education program in pain control.
1. The program shall include instruction in the following subject areas:
    - a. Anatomy and physiology of the human body and its response to the various pharmacologic agents used in pain control;
    - b. Physiological and psychological risks for the use of various modalities of pain control;
    - c. Psychological and physiological need for various forms of pain control and the potential response to pain control procedures;
    - d. Techniques of local anesthesia, sedation, and general anesthesia, and psychological management and behavior modification, as they relate to pain control in dentistry; and
    - e. Handling emergencies and complications related to pain control procedures, including the maintenance of respiration and circulation, immediate establishment of an airway, and cardiopulmonary resuscitation.
  2. The program shall consist of didactic and clinical training. The didactic component of the program shall:
    - a. Be the same for all dentists, whether general practitioners or specialists; and
    - b. Include each subject area listed in subsection (A)(1).
  3. The program shall provide at least one calendar year of training as prescribed in R4-11-1301(B)(6)(a).
- B. To maintain a Section 1301 or 1302 permit under R4-11-1301 or R4-11-1302 a permit holder shall:
1. Participate in 30 clock hours of continuing education every five years in one or more of the following areas:
    - a. General anesthesia,
    - b. Parenteral sedation,
    - c. Physical evaluation,
    - d. Medical emergencies,
    - e. Monitoring and use of monitoring equipment, or
    - f. Pharmacology of drugs and non-drug substances used in general anesthesia or parenteral sedation; and
  2. Provide confirmation of completing coursework within the two years prior to submitting the renewal application from one or more of the following:
    - a. Advanced cardiac life support (ACLS) from the American Heart Association or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
    - b. Pediatric advanced life support (PALS) in a practice treating pediatric patients; or
    - c. A recognized continuing education course in advanced airway management;
  3. Complete at least 10 general anesthesia, deep sedation or parenteral sedation cases a calendar year; and
  4. Apply a maximum of six hours from subsection (B)(2) toward the continuing education requirements for subsection (B)(1).



- 
- C. To maintain a Section 1303 permit issued under R4-11-1303, a permit holder shall:
1. Participate in 30 clock hours of continuing education every five years in one or more of the following areas:
    - a. Oral sedation,
    - b. Physical evaluation,
    - c. Medical emergencies,
    - d. Monitoring and use of monitoring equipment, or
    - e. Pharmacology of oral sedation drugs and non-drug substances; and
  2. Provide confirmation of completing coursework within the two years prior to submitting the renewal application from one or more of the following:
    - a. Cardiopulmonary resuscitation (CPR) Health Care Provider level from the American Heart Association, American Red Cross or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association or American Red Cross;
    - b. Advanced cardiac life support (ACLS) from the American Heart Association or another agency that follows the same procedures, standards, and techniques for training as the American Heart Association;
    - c. Pediatric advanced life support (PALS);
    - d. A recognized continuing education course in advanced airway management; and
  3. Complete at least 10 oral sedation cases a calendar year.

#### **Historical Note**

Section R4-11-1306 renumbered from R4-11-1305 and amended by final rulemaking at 9 A.A.R. 1054, effective May 6, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1307. Renewal of Permit**

- A. To renew a Section 1301, 1302, or 1303 permit, the permit holder shall:
1. Provide written documentation of compliance with the applicable continuing education requirements in R4-11-1306;
  2. Provide written documentation of compliance with the continued competency requirements in R4-11-1306;
  3. Before December 31 of the year the permit expires, submit a completed application on a form provided by the Board office as described in R4-11-1301, R4-11-1302, or R4-11-1303; and
  4. Not less than 90 days before the expiration of a permit holder's current permit, arrange for an onsite evaluation as described in R4-11-1301, R4-11-1302, or R4-11-1303.
- B. To renew a Section 1304 permit, the permit holder shall:
1. Before December 31 of the year the permit expires, submit a completed application on a form provided by the Board office as described in R4-11-1304; and
  2. Not less than 90 days before the expiration of a permit holder's current permit, arrange for an onsite evaluation as described in R4-11-1304.
- C. After the permit holder successfully completes the evaluation and submits the required affidavits, the Board shall renew a Section 1301, 1302, 1303, 1304 permit, as applicable.
- D. The Board may stagger due dates for renewal applications.

#### **Historical Note**

Made by final rulemaking at 19 A.A.R. 341, effective April 6, 2013 (Supp. 13-1).

## ARTICLE 14. DISPENSING DRUGS AND DEVICES

### R4-11-1401. Prescribing

- A. In addition to the requirements of A.R.S. § 32-1298(C), a dentist shall ensure that a prescription order contains the following information:
1. Date of issuance;
  2. Name and address of the patient to whom the prescription is issued;
  3. Name, strength, dosage form, and quantity of the drug or name and quantity of the device prescribed;
  4. Name and address of the dentist prescribing the drug; and
  5. Drug Enforcement Administration registration number of the dentist, if prescribing a controlled substance.
- B. Before dispensing a drug or device, a dentist shall present to the patient a written prescription for the drug or device being dispensed that includes on the prescription the following statement in bold type: "This prescription may be filled by the prescribing dentist or by a pharmacy of your choice."

#### Historical Note

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1401 repealed, new Section R4-11-1401 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp.05-1).

### R4-11-1402. Labeling and Dispensing

- A. A dentist shall include the following information on the label of all drugs and devices dispensed:
1. The dentist's name, address, and telephone number;
  2. The serial number;
  3. The date the drug or device is dispensed;
  4. The patient's name;
  5. Name, strength, and quantity of drug or name and quantity of device dispensed;
  6. The name of the drug or device manufacturer or distributor;
  7. Directions for use and cautionary statement necessary for safe and effective use of the drug or device; and
  8. If a controlled substance is prescribed, the cautionary statement "Caution: Federal law prohibits the transfer of this drug to any person other than the patient for whom it was prescribed."
- B. Before delivery to the patient, the dentist shall prepare and package the drug or device to ensure compliance with the prescription and personally inform the patient of the name of the drug or device, directions for its use, precautions, and storage requirements.
- C. A dentist shall purchase all dispensed drugs and devices from a manufacturer, distributor, or pharmacy that is properly licensed in this state or one of the other 49 states, the District of Columbia, the Commonwealth of Puerto Rico, or a territory of the United States of America.
- D. When dispensing a prescription drug or device from a prescription order, a dentist shall perform the following professional practices:
1. Verify the legality and pharmaceutical feasibility of dispensing a drug based upon:
    - a. A patient's allergies,
    - b. Incompatibilities with a patient's currently taken medications,
    - c. A patient's use of unusual quantities of dangerous drugs or narcotics, and
    - d. The frequency of refills;
  2. Verify that the dosage is within proper limits;
  3. Interpret the prescription order;
  4. Prepare, package, and label, or assume responsibility for preparing, packaging, and labeling, the drug or device dispensed under each prescription order;
  5. Check the label to verify that the label precisely communicates the prescriber's directions and hand-initial each label;
  6. Record, or assume responsibility for recording, the serial number and date dispensed on the front of the original prescription order; and
  7. Record on the original prescription order the name or initials of the dentist who dispensed the order.

---

### Historical Note

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1402 renumbered to R4-11-1201, new Section R4-11-1402 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

### R4-11-1403. Storage and Packaging

A dentist shall:

1. Keep all prescription-only drugs and devices in a secured area and control access to the secured area by written procedure. The dentist shall make the written procedure available to the Board or its authorized agents on demand for inspection or copying;
2. Keep all controlled substances secured in a locked cabinet or room, control access to the cabinet or room by written procedure, and maintain an ongoing inventory of the contents. The dentist shall make the written procedure available to the Board or its authorized agents on demand for inspection or copying;
3. Maintain drug storage areas so that the temperature in the drug storage areas does not exceed 85° F;
4. Not dispense a drug or device that has expired or is improperly labeled;
5. Not redispense a drug or device that has been returned;
6. Dispense a drug or device:
  - a. In a prepackaged container or light-resistant container with a consumer safety cap, unless the patient or patient's representative requests a non-safety cap; and
  - b. With a label that is mechanically or electronically printed;
7. Destroy an outdated, deteriorated, or defective controlled substance according to Drug Enforcement Administration regulations or by using a reverse distributor. A list of reverse distributors may be obtained from the Drug Enforcement Administration; and
8. Destroy an outdated, deteriorated, or defective non-controlled substance drug or device by returning it to the supplier or by using a reverse distributor. A list of reverse distributors may be obtained from the Drug Enforcement Administration.

### Historical Note

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1403 renumbered to R4-11-1202, new Section R4-11-1403 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

### R4-11-1404. Recordkeeping

A. A dentist shall:

1. Chronologically date and sequentially number prescription orders in the order that the drugs or devices are originally dispensed;
  2. Sequentially file orders separately from patient records, as follows:
    - a. File Schedule II drug orders separately from all other prescription orders;
    - b. File Schedule III, IV, and V drug orders separately from all other prescription orders; and
    - c. File all other prescription orders separately from orders specified in subsections (A)(2)(a) and (b);
  3. Record the name of the manufacturer or distributor of the drug or device dispensed on each prescription order and label;
  4. Record the name or initials of the dentist dispensing the drug or device on each prescription order and label; and
  5. Record the date the drug or device is dispensed on each prescription order and label.
- B. A dentist shall record in the patient's dental record the name, dosage form, and strength of the drug or device dispensed, the quantity or volume dispensed, the date the drug or device is dispensed, and the dental therapeutic reasons for dispensing the drug or device.
- C. A dentist shall maintain:

1. Purchase records of all drugs and devices for three years from the date purchased; and
  2. Dispensing records of all drugs and devices for three years from the date dispensed.
- D. A dentist who dispenses controlled substances:
1. Shall inventory Schedule II, III, IV, and V controlled substances as prescribed by A.R.S. § 36-2523;
  2. Shall perform a controlled substance inventory on March 1 annually, if directed by the Board, and at the opening or closing of a dental practice;
  3. Shall maintain the inventory for three years from the inventory date;
  4. May use one inventory book for all controlled substances;
  5. When conducting an inventory of Schedule II controlled substances, shall take an exact count;
  6. When conducting an inventory of Schedule III, IV, and V controlled substances, shall take an exact count or may take an estimated count if the stock container contains fewer than 1001 units.
- E. A dentist shall maintain invoices for drugs and devices dispensed for three years from the date of the invoices, filed as follows:
1. File Schedule II controlled substance invoices separately from records that are not Schedule II controlled substance invoices;
  2. File Schedule III, IV, and V controlled substance invoices separately from records that are not Schedule III, IV, and V controlled substance invoices; and
  3. File all non-controlled substance invoices separately from the invoices referenced in subsections (E)(1) and (2).
- F. A dentist shall file Drug Enforcement Administration order form (DEA Form 222) for a controlled substance sequentially and separately from every other record.

#### **Historical Note**

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1404 renumbered to R4-11-1203, new Section R4-11-1404 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-1405. Compliance**

- A. A dentist who determines that there has been a theft or loss of Drugs or Controlled Substances from the dentist's office shall immediately notify a local law enforcement agency and the Board and provide written notice of the theft or loss in the following manner:
1. For non-Controlled Substance Drug theft or loss, provide the law enforcement agency and the Board with a written report explaining the theft or loss; or
  2. For Controlled Substance theft or loss, complete a Drug Enforcement Administration's 106 form; and
  3. Provide copies of the Drug Enforcement Administration's 106 form to the Drug Enforcement Administration and the Board within one day of the discovery.
- B. A dentist who dispenses Drugs or devices in a manner inconsistent with this Article is subject to discipline under A.R.S. Title 32, Chapter 11, Article 3.

#### **Historical Note**

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1405 renumbered to R4-11-1204, new Section R4-11-1405 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 28 A.A.R. 1898 (August 5, 2022), effective September 12, 2022 (Supp. 22-3).

#### **R4-11-1406. Dispensing for Profit Registration and Renewal**

- A. A dentist who is currently licensed to practice dentistry in Arizona may dispense controlled substances, prescription-only drugs, and prescription-only devices for profit only after providing

---

the Board the following information:

1. A completed registration form that includes the following information:
    - a. The dentist's name and dental license number;
    - b. A list of the types of drugs and devices to be dispensed for profit, including controlled substances; and
    - c. Locations where the dentist desires to dispense the drugs and devices for profit; and
  2. A copy of the dentist's current Drug Enforcement Administration Certificate of Registration for each dispensing location from which the dentist desires to dispense the drugs and devices for profit.
- B. The Board shall issue a numbered certificate indicating the dentist is registered with the Board to dispense drugs and devices for profit.
- C. A dentist shall renew a registration to dispense drugs and devices for profit by complying with the requirements in subsection (A) before the dentist's license renewal date. When a dentist has made timely and complete application for the renewal of a registration, the dentist may continue to dispense until the Board approves or denies the application. Failure to renew a registration shall result in immediate loss of dispensing for profit privileges.

#### **Historical Note**

Adopted effective July 21, 1995; inadvertently not published with Supp. 95-3 (Supp. 95-4). Former Section R4- 11-1406 renumbered to R4-11-1205, new Section R4-11- 1406 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section repealed; new Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

#### **R4-11-1407. Renumbered**

#### **Historical Note**

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1407 renumbered to R4-11-1206 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1408. Renumbered**

#### **Historical Note**

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1408 renumbered to R4-11-1207 by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

#### **R4-11-1409. Repealed**

#### **Historical Note**

Adopted effective July 21, 1995 (Supp. 95-3). Former Section R4-11-1409 repealed by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1).

## **ARTICLE 15. COMPLAINTS, INVESTIGATIONS, DISCIPLINARY ACTION**

#### **R4-11-1501. Ex-parte Communication**

A complainant, licensee, certificate holder, business entity or mobile dental permit holder against whom a complaint is filed, shall not engage in ex-parte communication by means of a written or oral communication between a decision maker, fact finder, or Board member and only one party to the proceeding.

#### **Historical Note**

New Section R4-11-1501 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 334, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1502. Dental Consultant Qualifications**

A dentist, dental hygienist, or denturist approved as a Board dental consultant shall:

1. Possess a valid license or certificate to practice in Arizona;
2. Have practiced at least five years in Arizona; and
3. Not have been disciplined by the Board within the past five years.

---

### Historical Note

New Section R4-11-1502 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 19 A.A.R. 334, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1503. Initial Complaint Review**

- A. The Board's procedures for complaint notification are:
1. Board personnel shall notify the complainant and licensee, certificate holder, business entity or mobile dental permit holder by certified U.S. Mail when the following occurs:
    - a. A formal interview is scheduled,
    - b. The complaint is tabled,
    - c. A postponement or continuance is granted, and
    - d. A subpoena, notice, or order is issued.
  2. Board personnel shall provide the licensee, certificate holder, business entity, or mobile dental permit holder with a copy of the complaint.
  3. If a complaint alleges a violation of the state or federal criminal code, the Board shall refer the complaint to the proper law enforcement agency.
- B. The Board's procedures for complaints referred to clinical evaluation are:
1. Except as provided in subsection (B)(1)(a), the president's designee shall appoint one or more dental consultants to perform a clinical evaluation. If there is more than one dental consultant, the dental consultants do not need to be present at the same time.
    - a. If the complaint involves a dental hygienist, denturist, or dentist who is a recognized specialist in one of the areas listed in R4-11-1102(B), the president's designee shall appoint a dental consultant from that area of practice or specialty.
    - b. The Board shall not disclose the identity of the licensee to a dental consultant performing a clinical examination before the Board receives the dental consultant's report.
  2. The dental consultant shall prepare and submit a clinical evaluation report. The president's designee shall provide a copy of the clinical evaluation report to the licensee or certificate holder. The licensee or certificate holder may submit a written response to the clinical evaluation report.

### Historical Note

New Section R4-11-1503 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 334, effective April 6, 2013 (Supp. 13-1).

#### **R4-11-1504. Postponement of Interview**

- A. The licensee, certificate holder, business entity, or mobile dental permit holder may request a postponement of a formal interview. The Board or its designee shall grant a postponement until the next regularly scheduled Board meeting if the licensee, certificate holder, business entity, or mobile dental permit holder makes a postponement request and the request:
1. Is made in writing,
  2. States the reason for the postponement, and
  3. Is received by the Board within 15 calendar days after the date the respondent received the formal interview request.
- B. Within 48 hours of receipt of a request for postponement of a formal interview, the Board or its designee shall:
1. Review and either deny or approve the request for postponement; and
  2. Notify in writing the complainant and licensee, certificate holder, business entity, or mobile dental permit holder of the decision to either deny or approve the request for postponement.

### Historical Note

New Section R4-11-1504 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(E) at 9 A.A.R. 3669, effective April 30, 2003 (Supp. 03-3). New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1). Amended by final rulemaking at 19 A.A.R. 334, effective April 6, 2013 (Supp. 13-1).

## **ARTICLE 16. EXPIRED**

### **R4-11-1601. Expired**

#### **Historical Note**

New Section R4-11-1601 adopted by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Section expired under A.R.S. § 41-1056(E) at 14 A.A.R. 3183, effective April 30, 2008.

## **ARTICLE 17. REHEARING OR REVIEW**

### **R4-11-1701. Procedure**

- A. Except as provided in subsection (F), a licensee, certificate holder, or business entity who is aggrieved by an order issued by the Board may file a written motion for rehearing or review with the Board, pursuant to A.R.S. Title 41, Chapter 6, Article 10, specifying the grounds for rehearing or review.
- B. A licensee, certificate holder, or business entity filing a motion for rehearing or review under this rule may amend the motion at any time before it is ruled upon by the Board. The opposing party may file a response within 15 days after the date the motion for rehearing or review is filed. The Board may require that the parties file supplemental memoranda explaining the issues raised in the motion, and may permit oral argument.
- C. The Board may grant a rehearing or review of the order for any of the following causes materially affecting a licensee, certificate holder, or business entity's rights:
  1. Irregularity in the proceedings of the Board or any order or abuse of discretion, which deprived a licensee, certificate holder, or business entity of a fair hearing;
  2. Misconduct of the Board, its personnel, the administrative law judge, or the prevailing party;
  3. Accident or surprise which could not have been prevented by ordinary prudence;
  4. Excessive or insufficient penalties;
  5. Error in the admission or rejection of evidence or other errors of law occurring at the hearing or during the progress of the proceeding;
  6. That the findings of fact or decision is arbitrary, capricious, or an abuse of discretion;
  7. That the findings of fact of decision is not justified by the evidence or is contrary to law; or
  8. Newly discovered, material evidence which could not, with reasonable diligence, have been discovered and produced at the original hearing.
- D. The Board may affirm or modify the order or grant a rehearing or review to all or part of the issues for any of the reasons in subsection (C). The Board, within the time for filing a motion for rehearing or review, may grant a rehearing or review on its own initiative for any reason for which it might have granted relief on motion of a party. An order granting a rehearing or review shall specify the grounds on which rehearing or review is granted, and any rehearing or review shall cover only those matters specified.
- E. When a motion for rehearing or review is based upon affidavits, they shall be served with the motion. An opposing party may, within 15 days after such service, serve opposing affidavits.
- F. If the Board makes specific findings that the immediate effectiveness of the order is necessary for the preservation of public health and safety and that a rehearing or review is impracticable, unnecessary, or contrary to the public interest, the order may be issued as a final order without an opportunity for a rehearing or review. If an order is issued as a final order without an opportunity or rehearing or review, the aggrieved party shall make an application for judicial review of the order within the time limits permitted for application for judicial review of the Board's final order.
- G. The Board shall rule on the motion for rehearing or review within 15 days after the response has been filed, or at the Board's next meeting after the motion is received, whichever is later.

#### **Historical Note**

New Section R4-11-1701 renumbered from R4-11-701 and amended by final rulemaking at 5 A.A.R. 580, effective February 4, 1999 (Supp. 99-1). Amended by final rulemaking at 21 A.A.R. 2971, effective January 2, 2016 (Supp. 15-4).

## **ARTICLE 18. BUSINESS ENTITIES**

### **R4-11-1801. Application**

Before offering dental services, a business entity required to be registered under A.R.S. § 32-1213 shall apply for registration on an application form supplied by the Board. In addition to the requirements of A.R.S. § 32-1213(B) and the fee under R4-11-402, the registration application shall include a sworn statement from the applicant that:

1. The information provided by the business entity is true and correct, and
2. No information is omitted from the application.

#### **Historical Note**

New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).

### **R4-11-1802. Display of Registration**

- A. A business entity shall ensure that the receipt for the current registration period is:
  1. Conspicuously displayed in the dental practice in a manner that is always readily observable by patients and visitors, and
  2. Exhibited to members of the Board or to duly authorized agents of the Board on request.
- B. A business entity's receipt for the licensure period immediately preceding shall be kept on display until replaced by the receipt for the current period.

#### **Historical Note**

New Section made by final rulemaking at 11 A.A.R. 793, effective April 2, 2005 (Supp. 05-1).



**DEPARTMENT OF AGRICULTURE**

Title 4, Chapter 11

**New Section:** R3-2-1201, R3-2-1202, R3-2-1203



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - REGULAR RULEMAKING

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 3, 2023

**SUBJECT: DEPARTMENT OF AGRICULTURE**  
Title 3, Chapter 2

---

### **Summary:**

This regular rulemaking with the Department of Agriculture (Department) seeks to add three (3) new sections in Title 3, Chapter 2 related to establishing procedures for animal pounds that do not have a licensed veterinarian on staff to obtain and administer sodium pentobarbital or a derivative of sodium pentobarbital.

Historically, the state veterinarian had encouraged county pounds and agencies to have a veterinarian on staff or under contract to provide euthanasia services; however, over the last decade, the number of veterinarians practicing in rural areas has dropped significantly and most agencies do not have access to them. Given the need for county pounds/shelters and animal control agencies to successfully perform their duties, the Department is proposing this mechanism to procure sodium pentobarbital to facilitate euthanasia.

The Drug Enforcement Agency (DEA) is the primary source of enforcement with additional provisions for audits through the Office of the State Veterinarian as well as Arizona statutes and rules. Competencies are demonstrated through satisfactory training requirements and understanding of the Controlled Substance Act referenced by the American Veterinary Medical Association (AVMA) approved curricula as well as documented support from three references attesting to the individual's professionalism and moral character. Authorization from the state veterinarian runs concurrent with the expiration of the DEA license (valid for 3 years),

therefore individuals are required to retake and successfully complete an AVMA approved euthanasia curricula every three years.

**1. Are the rules legal, consistent with legislative intent, and within the agency's statutory authority?**

The Department cites both general and specific statutory authority for these rules.

**2. Do the rules establish a new fee or contain a fee increase?**

The Department indicates that this rulemaking does not establish a new fee or contain a fee increase.

**3. Does the preamble disclose a reference to any study relevant to the rules that the agency reviewed and either did or did not rely upon?**

The Department indicates it did not review or rely on any study in conducting this rulemaking.

**4. Summary of the agency's economic impact analysis:**

The Department does not anticipate any adverse economic impacts from this rulemaking. The proposed rulemaking reduces government expenditures by allowing animals owned by an animal shelter to be euthanized by a trained individual who is not a veterinarian; therefore, this proposed rulemaking reduces the burden on the local government and the taxpayers. Ultimately, the rulemaking will eliminate the need for an animal shelter to pay a veterinarian to euthanize shelter owned animals that they are unable to adopt or transfer to a rescue.

**5. Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Department has determined that the rules impose the least burden and costs to those who are regulated.

**6. What are the economic impacts on stakeholders?**

Businesses, private persons, consumers, state revenues, and private employment will be unaffected by the rulemaking. Private veterinary clinics could see a reduction in the number of animals which they euthanize on behalf of local government and might experience an inconsequential change to their gross income.

7. **Are the final rules a substantial change, considered as a whole, from the proposed rules and any supplemental proposals?**

The Department indicates that the final rules are not a substantial change, considered as a whole, from the proposed rules and any supplemental proposals because they are identical to the proposed rules.

8. **Does the agency adequately address the comments on the proposed rules and any supplemental proposals?**

The Department indicates that no comments were received during the open comment period; however, the Department did consult stakeholders prior to docket opening and these comments were incorporated into the notice of proposed rulemaking.

9. **Do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Department indicates that the rules do not require a permit or license, but that DEA licensure is needed for county shelters to acquire sodium pentobarbital.

10. **Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Department states that this section does not apply as there are no federal rules applicable to this rule.

11. **Conclusion**

This regular rulemaking with the Department of Agriculture (Department) seeks to add three (3) new sections in Title 3, Chapter 2 related to establishing procedures for animal pounds that do not have a licensed veterinarian on staff to obtain and administer sodium pentobarbital or a derivative of sodium pentobarbital.

The Department is requesting the standard 60-day delayed effective date pursuant to A.R.S. § 41-1032(A). Council staff recommends approval of this rulemaking.

KATIE HOBBS  
Governor



JEFF GRANT  
Interim Director

# Arizona Department of Agriculture

1802 W Jackson St #78, Phoenix, Arizona 85007  
(602) 542-4293 FAX (602) 542-4290

16-FEB-2023

Governor's Regulatory Review Council (G.R.C.C.)  
100 N. 15th Avenue Suite 302  
Phoenix, AZ 85007

RE: Notice of rulemaking consideration to G.R.C.C.

Dear Council,

On behalf of the Arizona Department of Agriculture, I hereby request final consideration for the rule "Acquisition and Use of Sodium Pentobarbital and Derivatives by Unlicensed Individuals in Animal Shelters". Record for this proposed rulemaking closed following the oral proceeding held on 15-NOV-2022. No comments were received during the comment period nor did the oral proceeding garner any public participation or testimony. This request does not relate to a 5-year review report, does not establish a new fee, does not establish a fee increase, and does not request an earlier immediate effective date over the standard process. The preamble accurately discloses that no study was applicable for review relevant to this rule.

Documents Enclosed:

1. Authorization to proceed with rulemaking
2. Notice of Final Rulemaking
3. Economic, Small Business & Consumer Impact Statement
4. Informal Written Comments Concerning the Proposed Rule
5. United States Code (21 U.S.C. 13) - Controlled Substance Act
6. AVMA Guidelines for Humane Euthanasia 2020 Ed.

Thank you for your consideration in this matter.

Sincerely,

A handwritten signature in black ink that reads "Jeffrey Grant".

Jeff Grant  
Interim Director  
Arizona Department of Agriculture

**NOTICE OF FINAL RULEMAKING**  
**TITLE 3. AGRICULTURE**  
**CHAPTER 2. ANIMAL SERVICES DIVISION**

**PREAMBLE**

**1. Article, Part, or Section Affected (as applicable) \_\_\_\_\_ Rulemaking Action**

R3-2-1201	New Section
R3-2-1202	New Section
R3-2-1203	New Section

**2. Citations to the agency's statutory rulemaking authority to include both the authorizing statute (general) and the implementing statute (specific):**

Authorizing statute: A.R.S. § 3-107

Implementing statute: A.R.S. § 3-1213

**3. The effective date of the rule:**

- a. If the agency selected a date earlier than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the earlier date and state the reason or reasons the agency selected the earlier effective date as provided in A.R.S. § 41-1032(A)(1) through (5):**

Not applicable.

- b. If the agency selected a date later than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the later date and state the reason or reasons the agency selected the later effective date as provided in A.R.S. § 41-1032(B):**

Not applicable.

**4. Citations to all related notices published in the *Register* as specified in R1-1-409(A) that pertain to the record of the final rulemaking package:**

Notice of Rulemaking Docket Opening: Volume 28, A.A.R. page 3326; and

Notice of Proposed Rulemaking: Volume 28, A.A.R. page 3263

**5. The agency's contact person who can answer questions about the rulemaking:**

Name: Dr. Ryan Wolker, State Veterinarian

Address: Arizona Department of Agriculture

1802 W Jackson St, #78

Phoenix, AZ 85007

Telephone: (602) 542-4293

Fax: (602) 542-4290

E-mail: [rwolker@azda.gov](mailto:rwolker@azda.gov)

Web site: [agriculture.az.gov](http://agriculture.az.gov)

**6. An agency's justification and reason why a rule should be made, amended, repealed or renumbered, to include an explanation about the rulemaking:**

A.R.S. § 3-1213 requires the State Veterinarian to establish procedures for county, city and town animal pounds that do not have a licensed veterinarian on the staff to obtain and administer sodium pentobarbital or a derivative of sodium pentobarbital. A.R.S. § 11-1021 specifies counties responsibilities for proper and humane care of impounded animals, and the procedures for humane euthanasia of animals in their custody which requires administration of euthanasia be performed by a licensed veterinarian or in accordance with the procedures established by A.R.S. § 3-1213. This proposed rule outlines the procedures to be established by the State Veterinarian to effectively execute this statutory mandate.

To the best of my knowledge, this statutory requirement has been law for about 20 years and historically, the State Veterinarian provided an authorization letter to the Drug Enforcement Agency (DEA) after reviewing the application and suitability of the county animal control officer identified as the responsible person. This individual could then obtain a DEA license for controlled substances. Since this process was a simple

agreement and not defined at all in rule, in consultation with our representative from the Arizona Attorney General's Office, it was recommended going forward that we author a rule to address this need and more importantly, provide a more defined and robust mechanism to audit or exercise control over this process. Several law enforcement agencies and shelters across the state utilize this lawful provision to acquire and administer sodium pentobarbital in the execution of their duties.

In the past, the State Veterinarian had encouraged county pounds or law enforcement agencies to have a veterinarian on staff or on-contract to provide euthanasia services, however, over the last decade the number of veterinarians practicing in rural areas has dropped precipitously. Most agencies cannot afford to keep a veterinarian on-contract and may not even have access to one. Given the need for county animal shelters and law enforcement agencies to successfully perform their duties, this mechanism to procure sodium pentobarbital to facilitate euthanasia in a dignified and humane manner is needed.

DEA licensure is needed for county shelters or law enforcement agencies to acquire sodium pentobarbital and the Controlled Substance Act through the DEA documents specific handling, inventory, and control requirements for individuals to store and use this medication. The DEA is the primary enforcement arm with additional provisions for audits through the Office of the State Veterinarian through this rule. The mechanism for responsible individuals to demonstrate their competence and satisfactory training requirements and understanding of the Controlled Substance Act referenced by American Veterinary Medical Association (AVMA) Approved Curricula as well as documented support from three references attesting to their professionalism and moral character are also detailed in this rule package. Since the authorization from the State Veterinarian would run concurrent with the expiration of the DEA license (valid for 3 years), responsible individuals will essentially be required to recertify every 3 years whereby they will need to retake and successfully complete an AVMA approved euthanasia curricula.

**7. A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

Not applicable.



**8. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable. No political subdivision's grant of authority is diminished by implementation of this rule.

**9. A summary of the economic, small business, and consumer impact:**

The Department of Agriculture does not anticipate any adverse economic impacts affecting consumers or small business. The proposed rulemaking reduces government expenditures by allowing animals owned by an animal shelter to be euthanized by a trained individual who is not a veterinarian. Veterinary positions are costly and smaller animal shelters do not have the budget for a staff veterinarian. Therefore, this proposed rulemaking reduces the burden on the local government and the taxpayers.

**10. A description of any changes between the proposed rulemaking, to include supplemental notices, and the final rulemaking:**

Not applicable. The proposed rulemaking and final rulemaking verbiage is identical.

**11. An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments:**

No public or stakeholder comments were made during the official open comment period. Stakeholders representing animal shelters across the state were informally consulted prior to the docket opening to garner opinions on what a rule like this should encompass and considerations for implementation. Public stakeholder comments were incorporated into the initial Notice of Proposed Rulemaking.

**12. All agencies shall list other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:**

**a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:**

Not applicable.

**b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:**

Not applicable.

**c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:**

No analysis was conducted.

**13. A list of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rule:**

The rule incorporates the following documents:

- A. "Controlled Substance Act" means the United States Code, Chapter 13, Drug Abuse Prevention and Control, defined in R3-2-1201, and referred to in R3-2-1203.
- B. American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals: 2020 Edition" means that specific edition of guidelines and does not include any later amendments or editions of the incorporated material, defined in R3-2-1201, and referred to in R3-2-1202.

**14. Whether the rule was previously made, amended or repealed as an emergency rule. If so, cite the notice published in the Register as specified in R1-1-409(A). Also, the agency shall state where the text was changed between the emergency and the final rulemaking packages:**

Not applicable.

**15. The full text of the rules follows:**

**TITLE 3. AGRICULTURE**

**CHAPTER 2. ANIMAL SERVICES DIVISION**

**ARTICLE 12. ACQUISITION AND USE OF SODIUM PENTOBARBITAL AND DERIVATIVES**

**BY UNLICENSED INDIVIDUALS IN ANIMAL SHELTERS**

*Section*

R3-2-1201. Definitions

R3-2-1202. General Provisions

R3-2-1203. Requirements of Euthanasia Approved Curriculum; Recordkeeping; Inspection

**ARTICLE 12. ACQUISITION AND USE OF SODIUM PENTOBARBITAL AND DERIVATIVES  
BY UNLICENSED INDIVIDUALS IN ANIMAL SHELTERS**

**R3-2-1201. Definitions**

1. “Agreement” shall refer to a contract signed by the responsible person and the State Veterinarian whereby the responsible person has met all requirements set forth in Section R3-2-1202. The agreement remains in effect until the expiration of the DEA registration or a change in employment status of the responsible person with the animal shelter.
2. “Approved curriculum” means any euthanasia-training curriculum approved by the AVMA or the State Veterinarian of Arizona.
3. “Authorized employee” means an unlicensed individual who is authorized to euthanize animals, takes direction from a responsible person or a licensed person, and has obtained State-Veterinarian-approved training in the use and handling of controlled substances as set forth in this Article.
4. “AVMA” means the American Veterinary Medical Association.
5. “AVMA Guidelines for the Euthanasia of Animals: 2020 Edition” means that specific edition of guidelines and does not include any later amendments or editions of the incorporated material, and is on file with the Department.
6. “Controlled Substances Act” refers to 21 U.S.C. § 801, et seq.
7. “Controlling person” means the natural person who exercises legal ownership, control, or designated leadership of a shelter.
8. “DEA” refers to the federal Drug Enforcement Agency.
9. “Licensed person” means a veterinarian licensed by the Arizona Veterinary Medical Examining Board, who is exempt from the euthanasia training requirements.

10. “Responsible person” means an unlicensed individual who meets the requirements of R3-2-1202, who is employed by the shelter, and who in the absence of a licensed person, has agreed to supervise the acquisition, storage, administration, and record keeping of the controlled substances in accordance with the Controlled Substances Act and this Article.
11. “Shelter” means an animal care and control shelter operated by any town, city, county or the state, including privately operated animal shelters that are utilized by a town, city, county or the state.
12. “State Veterinarian” means the person appointed as the State Veterinarian under A.R.S. § 3-1211.

**R3-2-1202. General Provisions**

- A. Euthanasia of animals shall be done in in compliance with the provisions of this Article and in accordance with procedures established under A.R.S. § 11-1021 by the local governing body.
- B. Any shelter that does not employ a licensed supervisory veterinarian may apply for a DEA controlled-substances registration for each physical location in order to administer euthanasia. DEA will only grant the registration if the shelter is approved by, and meets the standards of, the State Veterinarian, as follows:
  1. The responsible person is formally designated by the controlling person of the shelter as the individual responsible to obtain and manage controlled substances on behalf of the shelter;
  2. The responsible person must successfully complete an approved euthanasia training course;
  3. The responsible person and the State Veterinarian must execute an agreement obligating the responsible person to comply with this Article;
  4. The responsible person is 21 years of age or older; and
  5. The responsible person shall provide three professional references to the State Veterinarian to demonstrate professionalism and good moral character.
- C. Duties and responsibilities of the responsible person are to:

1. Abide by all local, state, and federal laws and regulations pertaining to the operation of a shelter, including those laws and regulations governing possession and use of controlled substances.
  2. Ensure that any authorized employee who administers euthanasia complies with the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals: 2020 Edition.
  3. Ensure that any authorized employee who administers euthanasia has successfully completed a curriculum of euthanasia training approved by the State Veterinarian.
- D. Prior to the expiration of the current DEA registration, the responsible person shall submit an application to the State Veterinarian at least 45 days prior to that expiration, requesting re-approval of the shelter according to the requirements of this Article. The State Veterinarian approval shall run concurrently with the DEA registration, except as indicated in subsection (E).
- E. The shelter shall inform the State Veterinarian within 14 days of a change in:
1. Ownership or controlling person;
  2. Location;
  3. Responsible person; or
  4. Expiration or termination of an agreement or contract between a town, city, county or state utilizing the services of privately operated shelter(s).
- F. Upon a change listed in subsection (E), the controlling person shall file an application with the State Veterinarian, requesting re-approval of the shelter according to the requirements of this Article. The existing agreement terminates upon the date of the change, and the shelter shall not administer any controlled substances until the State Veterinarian approves the new application and a new DEA registration is obtained.

**R3-2-1203. Requirements of Euthanasia Approved Curriculum; Recordkeeping; Inspection**

A. The following organizations offer approved euthanasia courses: The American Humane Association; The National Animal Care and Control Association; Companion Animal Euthanasia Training Academy. The State Veterinarian reserves the right to approve or withdraw the approval of curricula at any time. Approved curriculum training shall include an instructional section and a practical exam showing skill competency; and shall include, but not be limited to, the following topics:

1. Anatomy;
2. Personnel safety, controlled substance diversion, and compassion fatigue;
3. Controlled substance handling and mechanism of action;
4. Humane methods of handling and euthanasia of domestic animals;
5. Methods to ensure barriers between animals during euthanasia;
6. Concepts particular to euthanasia of wild or feral animals;
7. Administering pre-euthanasia sedatives;
8. Verification of death; and
9. Acceptable methods of disposal of animal remains and euthanasia supplies.

B. The responsible person shall keep records of all euthanasia-related activities including, but not limited to:

1. Identification of animals euthanized;
2. Reason for euthanasia;
3. Method of euthanasia;
4. Adverse events; and
5. All recordkeeping required by the Controlled Substances Act.

C. A shelter is subject to periodic random inspection by the Office of the State Veterinarian. Upon request by the Office of the State Veterinarian, the responsible person or controlling person shall immediately produce records.

D. Following an audit or inspection, if evidence exists of noncompliance with the above standards, the State Veterinarian reserves the right to modify the agreement. The State Veterinarian may also terminate the agreement, and notify the DEA that the shelter has lost approval by the State Veterinarian to administer euthanasia by unlicensed individuals.

**ECONOMIC, SMALL BUSINESS, AND CONSUMER IMPACT**

**STATEMENT**

**TITLE 3. AGRICULTURE**

**CHAPTER 2. DEPARTMENT OF AGRICULTURE - ANIMAL**

**SERVICES DIVISION**

**ARTICLE 12. Acquisition and Use of Sodium Pentobarbital and**

**Derivatives by Unlicensed Individuals in Animal Shelters**

1. Identification of the rulemaking:

According to state statute, the state veterinarian “Shall establish procedures for county, city and town animal pounds that do not have a licensed veterinarian on the staff to obtain and administer sodium pentobarbital or a derivative of sodium pentobarbital.” This proposed rule outlines the procedures established by the state veterinarian allowing trained individuals working in animal shelters to euthanized shelter owned animals.

2. A brief summary of the information included in the economic, small business, and consumer impact statement:

The Department of Agriculture does not anticipate any adverse economic impacts affecting consumers or small business. The proposed rulemaking reduces government expenditures by allowing animals owned by an animal shelter to be euthanized by a trained individual who is not a veterinarian. Veterinary positions are costly and smaller animal shelters do not have the budget for a staff veterinarian. Therefore, this proposed rulemaking reduces the burden on the local government and the taxpayers.



3. The person to contact to submit or request additional data on the information included in the economic, small business, and consumer impact statement:

Name: Dr. Ryan Wolker, State Veterinarian

Address: Arizona Department of Agriculture

1802 W Jackson St, #78

Phoenix, AZ 85007

Telephone:(602) 359-1152

Fax: (602) 542-4290

E-mail: [rwolker@azda.gov](mailto:rwolker@azda.gov)

4. Persons who will be directly affected by, bear the costs of, or directly benefit from the rulemaking:

No private persons will financially benefit or bear additional costs secondary to this rulemaking.

5. Cost-benefit analysis:

The rulemaking will eliminate the need for an animal shelter to pay a veterinarian to euthanize shelter owned animals that they are unable to adopt or transfer to a rescue. The current cost of a full time veterinarian is currently \$70,000-\$145,000 annually for salary alone. Many smaller shelters do not have the budget for this expenditure.

Costs and benefits to businesses directly affected by the rulemaking:

Private veterinary clinics could see a reduction in the number of animals, which they euthanize on behalf of local government, but the change in gross income will be inconsequential.

6. Impact on private and public employment:

The rulemaking will have no impact on private employment and it will reduce the employment cost taken on by local government.

7. Impact on small businesses:

No businesses, regardless of size, are subject to the rulemaking.

8. Cost and benefit to private persons and consumers who are directly affected by the rulemaking:

The rulemaking will have no impact on private persons and consumers.

9. Probable effects on state revenues:

There will be no effect on state revenues.

**§ 3-107. Organizational and administrative powers and duties of the director**

A. The director shall:

1. Formulate the program and policies of the department and adopt administrative rules to effect its program and policies.
2. Ensure coordination and cooperation in the department in order to achieve a unified policy of administering and executing its responsibilities.
3. Subject to section 35-149, accept, expend and account for gifts, grants, devises and other contributions of money or property from any public or private source, including the federal government. All contributions shall be included in the annual report under paragraph 6 of this subsection. Monies received under this paragraph shall be deposited, pursuant to sections 35-146 and 35-147, in special funds for the purpose specified, which are exempt from the provisions of section 35-190 relating to lapsing of appropriations.
4. Contract and enter into interagency and intergovernmental agreements pursuant to title 11, chapter 7, article 3 with any private party or public agency.
5. Administer oaths to witnesses and issue and direct the service of subpoenas requiring witnesses to attend and testify at or requiring the production of evidence in hearings, investigations and other proceedings.
6. Not later than September 30 each year, issue a report to the governor and the legislature of the department's activities during the preceding fiscal year. The report may recommend statutory changes to improve the department's ability to achieve the purposes and policies established by law. The director shall provide a copy of the report to the Arizona state library, archives and public records.
7. Establish, equip and maintain a central office in Phoenix and field offices as the director deems necessary.
8. Sign all vouchers to expend money under this title, which shall be paid as other claims against this state out of the appropriations to the department.
9. Coordinate agricultural education efforts to foster an understanding of Arizona agriculture and to promote a more efficient cooperation and understanding among agricultural educators, producers, dealers, buyers, mass media and the consuming public to stimulate the production, consumption and marketing of Arizona agricultural products.

10. Employ staff subject to title 41, chapter 4, article 4 and terminate employment for cause as provided by title 41, chapter 4, article 5.

11. Conduct hearings on appeals by producers regarding the assessed actual costs of the plow up and the penalty of one hundred fifty per cent for unpaid costs pursuant to section 3-204.01. The director may adopt rules to implement this paragraph.

12. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.

B. The director may:

1. Authorize in writing any qualified officer or employee in the department to perform any act that the director is authorized or required to do by law.

2. Construct and operate border inspection stations or other necessary facilities in this state and cooperate by joint agreement with an adjoining state in constructing and operating border inspection stations or other facilities within the boundaries of this state or of the adjoining state.

3. Cooperate with agencies of the United States and other states and other agencies of this state and enter into agreements in developing and administering state and federal agricultural programs regarding the use of department officers, inspectors or other resources in this state, in other states or in other countries.

4. Cooperate with the office of tourism in distributing Arizona tourist information.

5. Enter into compliance agreements with any person, state or regulatory agency. For the purposes of this paragraph, "compliance agreement" means any written agreement or permit between a person and the department for the purpose of enforcing the department's requirements.

6. Abate, suppress, control, regulate, seize, quarantine or destroy any agricultural product or foodstuff that is adulterated or contaminated as the result of an accident at a commercial nuclear generating station as defined in section 26-301, paragraph 1. A person owning an agricultural product or foodstuff that has been subject to this paragraph may request a hearing pursuant to title 41, chapter 6, article 10.

**ARS 3-107 Organizational and administrative powers and duties  
of the director (Arizona Revised Statutes (2023 Edition))**

---

7. Engage in joint venture activities with businesses and commodity groups that are specifically designed to further the mission of the department, that comply with the constitution and laws of the United States and that do not compete with private enterprise.

8. Sell, exchange or otherwise dispose of personal property labeled with the "Arizona grown" trademark. Revenues received pursuant to this paragraph shall be credited to the commodity promotion fund established by section 3-109.02.

**History:**

Amended by L. 2013, ch. 161,s. 1, eff. 9/13/2013. L12, ch 321, sec 1.

**ARS 3-1213 Acquisition and use of sodium pentobarbital or  
sodium pentobarbital derivative by county and local pounds  
(Arizona Revised Statutes (2023 Edition))**

---

**§ 3-1213. Acquisition and use of sodium pentobarbital or sodium pentobarbital derivative by county and local pounds**

The state veterinarian, in consultation with the director, shall establish procedures for county, city and town animal pounds that do not have a licensed veterinarian on the staff to obtain and administer sodium pentobarbital or a derivative of sodium pentobarbital.

**History:**

Amended by L. 2017, ch. 275, s. 1, eff. 8/9/2017.

# AVMA Guidelines for the Euthanasia of Animals: 2020 Edition\*

## Members of the Panel on Euthanasia

Steven Leary, DVM, DACLAM (Chair); Fidelis Pharmaceuticals, High Ridge, Missouri  
Wendy Underwood, DVM (Vice Chair); Indianapolis, Indiana  
Raymond Anthony, PhD (Ethicist); University of Alaska Anchorage, Anchorage, Alaska  
Samuel Cartner, DVM, MPH, PhD, DACLAM (Lead, Laboratory Animals Working Group);  
University of Alabama at Birmingham, Birmingham, Alabama  
Temple Grandin, PhD (Lead, Physical Methods Working Group); Colorado State University, Fort Collins, Colorado  
Cheryl Greenacre, DVM, DABVP (Lead, Avian Working Group); University of Tennessee, Knoxville, Tennessee  
Sharon Gwaltney-Brant, DVM, PhD, DABVT, DABT (Lead, Noninhaled Agents Working Group); Veterinary Information Network, Mahomet, Illinois  
Mary Ann McCrackin, DVM, PhD, DACVS, DACLAM (Lead, Companion Animals Working Group);  
University of Georgia, Athens, Georgia  
Robert Meyer, DVM, DACVAA (Lead, Inhaled Agents Working Group); Mississippi State University, Mississippi State, Mississippi  
David Miller, DVM, PhD, DACZM, DACAW (Lead, Reptiles, Zoo and Wildlife Working Group); Loveland, Colorado  
Jan Shearer, DVM, MS, DACAW (Lead, Animals Farmed for Food and Fiber Working Group); Iowa State University, Ames, Iowa  
Tracy Turner, DVM, MS, DACVS, DACVSMR (Lead, Equine Working Group); Turner Equine Sports Medicine and Surgery, Stillwater, Minnesota  
Roy Yanong, VMD (Lead, Aquatics Working Group); University of Florida, Ruskin, Florida

## AVMA Staff Consultants

Cia L. Johnson, DVM, MS, MSc; Director, Animal Welfare Division  
Emily Patterson-Kane, PhD; Animal Welfare Scientist, Animal Welfare Division

---

The following individuals contributed substantively through their participation in the Panel's Working Groups, and their assistance is sincerely appreciated.

Inhaled Agents—Scott Helms, DVM, DABVP; Lee Niel, PhD; Daniel Weary, PhD  
Noninhaled Agents—Virginia Fajt, DVM, PhD, DACVCP  
Physical Methods—Rose Gillesby, DVM; Jeff Hill, PhD; Jennifer Woods, BSc  
Aquatics—Craig Harms, DVM, PhD, DACZM; Nick Saint-Erne, DVM; Michael Stoskopf, DVM, PhD, DACZM  
Avian—Laurel Degernes, DVM, MPH, DABVP; Laurie Hess, DVM, DABVP; Kemba Marshall, DVM, DABVP; James Morrisey, DVM, DABVP; Joanne Paul-Murphy, DVM, DACZM, DACAW  
Companion Animals—Kathleen Cooney, MS, DVM; Stacey Frick, DVM; John Mays; Rebecca Rhoades, DVM  
Equids—Fairfield Bain, DVM, MBA, DACVIM, DACVP, DACVECC; Thomas R. Lenz, DVM, MS, DACT; Nathaniel Messer IV, DVM, DABVP; Stuart Shoemaker, DVM, DACVS  
Food and Fiber Animals—Eric Benson, PhD; C. Scanlon Daniels, DVM, MBA; John Deen, DVM, PhD, DABVP, DACAW; John Gilliam, DVM, MS, DACVIM, DABVP; Dee Griffin, DVM, MS; Glen Johnson, DVM; James Kober, DVM; Meghann Pierdon, VMD, DACAW; Paul Plummer, DVM, DACVIM-LA; Richard Reynnells, PhD; James Reynolds, DVM, MPVM, DACAW; Bruce Webster, PhD  
Laboratory Animals—James Artwhol, MS, DVM, DACLAM; Larry Carbone, DVM, PhD, DACLAM; Paul Flecknell, VetMB, MRCVS, PhD, DECVA, DECLAM, DACLAM, FRCVS; David P. Friedman, PhD; Debra Hickman, DVM, DACLAM, DACAW; Kathleen Pritchett-Corning, DVM, DACLAM, MRCVS  
Reptiles, Zoo and Wild Animals—Scott Citino, DVM, DACZM; Mark Drew, DVM, MS, DACZM; Julie Goldstein, DVM; Barry Hartup, DVM, PhD; Gregory Lewbart, MS, VMD, DACZM; Douglas Mader, MS, DVM, DABVP, FRSM; Patrick Morris, DVM, DACZM

---

\*The AVMA Panel on Euthanasia develops the content of the guidelines, with support from its working groups. The panel is required to do a comprehensive review and update of the report at least every 10 years, although more frequent major revisions are possible based on substantive information gleaned from new research and experience with practical implementation. To ensure the guidelines remain as up-to-date as possible, interim revisions (reflecting substantive updates, but of a less extensive nature than a major revision) are also accommodated.

Copyright © 2020 by the  
American Veterinary Medical Association  
1931 N. Meacham Road  
Schaumburg, IL 60173

The AVMA Guidelines for the Euthanasia of Animals: 2020 Edition (“work”) is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License (<http://creativecommons.org/licenses/by-nc-nd/3.0/>). You are free to share, copy, distribute, or transmit the work, provided that proper attribution to the American Veterinary Medical Association is included (but not in any way that suggests that the AVMA endorses you or your use of the work). You may not use this work for commercial purposes, including without limitation any sale of the work, or modify or change the work in any way, or create derivative works from it without permission of the American Veterinary Medical Association.

ISBN 978-1-882691-09-8

Version 2020.0.1





# CONTENTS

## Part I—Introduction and General Comments

I1 Preface .....	4
I2 Historical Context and Current Edition .....	4
I2.1 History of the Panel on Euthanasia .....	4
I2.2 Substantive Changes Since the Last Edition .....	5
I2.3 Statement of Use .....	5
I3 What Is Euthanasia? .....	6
I3.1 A Good Death as a Matter of Humane Disposition .....	6
I3.2 A Good Death as a Matter of Humane Technique .....	7
I4 Euthanasia and Veterinary Medical Ethics .....	7
I5 Evaluating Euthanasia Methods .....	9
I5.1 Consciousness and Unconsciousness .....	10
I5.2 Pain and Its Perception .....	11
I5.3 Stress and Distress .....	12
I5.4 Animal Behavior .....	13
I5.5 Human Behavior .....	14
I5.6 Sedation Versus Anesthesia .....	15
I6 Mechanisms of Euthanasia .....	16
I7 Confirmation of Death .....	16
I8 Disposal of Animal Remains .....	17
I9 Footnotes .....	18
I10 References .....	18

## Part II—Methods of Euthanasia

M1 Inhaled Agents .....	22
M1.1 Common Considerations .....	22
M1.2 Principles Governing Administration .....	23
M1.3 Inhaled Anesthetics .....	24
M1.4 Carbon Monoxide .....	26
M1.5 Nitrogen, Argon .....	27
M1.6 Carbon Dioxide .....	28
M2 Noninhaled Agents .....	32
M2.1 Common Considerations .....	32
M2.2 Routes of Administration .....	32
M2.3 Barbituric Acid Derivatives .....	33
M2.4 Pentobarbital Combinations .....	34
M2.5 Tributame .....	34
M2.6 T-61 .....	35
M2.7 Ultrapotent Opioids .....	35
M2.8 Dissociative Agents and $\alpha_2$ -Adrenergic Receptor Agonists .....	35
M2.9 Potassium Chloride and Magnesium Salts .....	36
M2.10 Chloral Hydrate and $\alpha$ -Chloralose .....	36
M2.11 Alcohols .....	37
M2.12 MS 222 (TMS) .....	37
M2.13 Benzocaine Hydrochloride .....	38
M2.14 Eugenol .....	38
M2.15 2-Phenoxyethanol .....	39
M2.16 Quinaldine (2-Methylquinoline, Quinalidine Sulfate) .....	39
M2.17 Metomidate .....	39
M2.18 Sodium Hypochlorite .....	39
M2.19 Formaldehyde .....	40
M2.20 Lidocaine Hydrochloride .....	40
M2.21 Unacceptable Agents .....	40
M3 Physical Methods .....	40
M3.1 Common Considerations .....	40
M3.2 PCB .....	41
M3.3 NPCB .....	41
M3.4 Manually Applied Blunt Force Trauma to the Head .....	42

M3.5 Gunshot .....	42
M3.6 Cervical Dislocation .....	44
M3.7 Decapitation .....	44
M3.8 Electrocution .....	45
M3.9 Kill Traps .....	46
M3.10 Maceration .....	47
M3.11 Focused Beam Microwave Irradiation .....	47
M3.12 Thoracic (Cardiopulmonary, Cardiac) Compression .....	47
M3.13 Adjunctive Methods .....	48
M4 Footnotes .....	48
M5 References .....	48

## Part III—Methods of Euthanasia by Species and Environment

S1 Companion Animals .....	56
S1.1 General Considerations .....	56
S1.2 Acceptable Methods .....	57
S1.3 Acceptable With Conditions Methods .....	57
S1.4 Adjunctive Methods .....	58
S1.5 Unacceptable Methods .....	58
S1.6 Special Considerations .....	58
S1.7 Fetuses and Neonates .....	59
S1.8 Euthanasia in Specific Environments .....	59
S2 Laboratory Animals .....	60
S2.1 General Considerations .....	60
S2.2 Small Laboratory and Wild-Caught Rodents (Mice, Rats, Hamsters, Guinea Pigs, Gerbils, Degus, Cotton Rats, etc) .....	60
S2.3 Laboratory Farm Animals, Dogs, Cats, Ferrets, and Nonhuman Primates .....	62
S2.4 Laboratory Rabbits .....	63
S2.5 Laboratory Fish, Amphibians, and Reptiles .....	64
S3 Animals Farmed for Food and Fiber .....	64
S3.1 General Considerations .....	64
S3.2 Bovids and Small Ruminants .....	65
S3.3 Swine .....	72
S3.4 Poultry .....	76
S4 Equids .....	78
S4.1 General Considerations .....	78
S4.2 Methods .....	78
S4.3 Special Cases and Exceptions .....	79
S5 Avians .....	79
S5.1 General Considerations .....	79
S5.2 Methods .....	80
S5.3 Eggs, Embryos, and Neonates .....	82
S6 Fish and Aquatic Invertebrates .....	82
S6.1 General Considerations .....	82
S6.2 Finfish .....	83
S6.3 Aquatic Invertebrates .....	89
S7 Zoologic and Free-Ranging Nondomestic Animals .....	90
S7.1 General Considerations .....	90
S7.2 Captive Invertebrates .....	91
S7.3 Captive Amphibians and Reptiles .....	92
S7.4 Captive Nonmarine Mammals .....	94
S7.5 Captive Marine Mammals .....	96
S7.6 Free-Ranging Wildlife .....	97
S7.7 Free-Ranging Marine Mammals .....	99
S8 Footnotes .....	100
S9 References .....	100
Glossary .....	110
Appendices .....	111

## ABBREVIATIONS

---

ASIC	Acid-sensing ion channel	IACUC	Institutional animal care and use committee
CAS	Controlled atmospheric stunning	MS 222	Tricaine methanesulfonate
DEA	Drug Enforcement Agency	NPCB	Nonpenetrating captive bolt
EEG	Electroencephalogram or electroencephalographic	PCB	Penetrating captive bolt
EPA	Environmental Protection Agency	POE	Panel on Euthanasia
HPA	Hypothalamic-pituitary axis	SNS	Sympathetic nervous system

# Part I—Introduction and General Comments

## II Preface

Animal issues are no longer socially invisible, and increasingly, greater attention is being devoted to understanding the moral significance of experiences of animals and to taking into consideration the welfare of animals. During the past half-century, efforts to ensure the respectful and humane treatment of animals have garnered global attention.<sup>1,2</sup> Concern for the welfare of animals is reflected in the growth of animal welfare science and ethics. The former is evident in the emergence of academic programs, establishment of specialty colleges, implementation of curricular changes in veterinary colleges, proliferation of scientific journal articles, and development of funding streams committed either partially or exclusively to the study of how animals are impacted by various environments and human interventions. The latter has seen the application of numerous ethical approaches (eg, rights-based theories, utilitarianism, virtue ethics, contractarianism, pragmatic ethics) to assessing the moral value of animals and the nature of the human-animal relationship.<sup>1,3-9</sup> The proliferation of interest in animal use and care, at the national and international levels, is also apparent in recent protections accorded to animals in new and amended laws and regulations, institutional and corporate policies, and purchasing and trade agreements. Changing societal attitudes toward animal care and use have inspired scrutiny of some traditional and contemporary practices applied in the management of animals used for agriculture, research and teaching, companionship, and recreation or entertainment and of animals encountered in the wild. Attention has also been focused on conservation and the impact of human interventions on terrestrial and aquatic wildlife and the environment. Within these contexts, veterinarians provide leadership on how to care well for animals, including how to relieve unnecessary pain and suffering.

In creating the 2020 and 2013 edition of the AVMA Guidelines for the Euthanasia of Animals (Guidelines), the POE made every effort to identify and apply the best research and empirical information available. As new research is conducted and more practical experience gained, recommended methods of euthanasia may change. As such, the AVMA and its POE

have made a commitment to ensure the Guidelines reflect an expectation and paradigm of continuous improvement that is consistent with the obligations of the Veterinarian's Oath.<sup>10</sup> As for other editions of the document, modifications of previous recommendations are also informed by continued professional and public sensitivity to the ethical care of animals.

While some euthanasia methods may be utilized in slaughter (which refers to humane killing of animals destined for human consumption) or harvest and depopulation, recommendations related to humane slaughter and depopulation fall outside the purview of the Guidelines and are addressed by separate documents.

The Guidelines set criteria for euthanasia, specify appropriate euthanasia methods and agents, and are intended to assist veterinarians in their exercise of professional judgment. The Guidelines acknowledge that euthanasia is a process involving more than just what happens to an animal at the time of its death. Apart from delineating appropriate methods and agents, these Guidelines also recognize the importance of considering and applying appropriate pre-euthanasia (eg, sedation) and animal handling practices, as well as attention to disposal of animals' remains.

## 12 Historical Context and Current Edition

### 12.1 HISTORY OF THE PANEL ON EUTHANASIA

Since 1963 the AVMA has convened a POE to evaluate methods and potential methods of euthanasia for the purpose of creating guidelines for veterinarians who carry out or oversee the euthanasia of animals. The scope of the 1963 edition was limited to methods and recommendations applicable to dogs, cats, and other small mammals. Subsequent editions published in 1972 and 1978 encompassed more methods and species (laboratory animals and food animals, respectively), and included additional information about animals' physiologic and behavioral responses to euthanasia (specifically, pain, stress, and distress), euthanasia's effects on observers, and the economic feasibility and environmental impacts of various approaches. In 1986 information on poikilothermic, aquatic, and fur-bearing wildlife was introduced; in 1993 recommendations for horses and wildlife were

added; and in 2000 an update acknowledged a need for more research on approaches suitable for depopulation. An interim revision by the AVMA Animal Welfare Committee in 2007 incorporated information derived from an existing, but separate, AVMA policy on the use of maceration to euthanize day-old chicks, poults, and pipped eggs, and the name of the report was changed to the AVMA Guidelines on Euthanasia.

In 2013 the process for compiling the POE's report was substantially changed to include more breadth and depth of expertise in the affected species and environments in which euthanasia is performed. More than 3 years of deliberation by more than 60 individuals, including veterinarians, animal scientists, behaviorists, psychologists, and an animal ethicist, resulted in robust commentary and recommendations. A comment period allowed AVMA members an opportunity to provide input and share their experiences directly with POE members.

The 2020 iteration of the Guidelines constitutes the ninth edition of the POE's report. The process for compiling this edition was similar to that of the 2013 edition. Two years of review, discussion, and revision by the POE culminated in this edition. A comment period was held and the input from AVMA members helps ensure the resulting document is not only scientifically robust, but practically sound.

## 12.2 SUBSTANTIVE CHANGES SINCE THE LAST EDITION

In this interim update of the Guidelines, methods, techniques, and agents of euthanasia have been updated and detailed descriptions have been included to assist veterinarians in applying their professional judgment. Species-specific sections have been expanded or added to include more guidance for terrestrial and aquatic species kept for a variety of purposes and under different conditions. Where possible, appropriate flowcharts, illustrations, tables, and appendices have been used to clarify recommendations. **Appendices 1 and 2** may be useful as a quick reference guide, but should never be used in lieu of the full text of the document by those performing euthanasia. All illustrations and figures have been moved to **Appendix 3** of the document.

Some of the more significant changes are as follows:

- Language was added to clarify the distinction between sedation and anesthesia. Specifically, animals under sedation may be aroused to a conscious state with sufficient stimulation. Recognizing this is critical when categorizing the effects of agents and distinguishing even deep states of sedation from unconsciousness.
- The conditions for the use of CO<sub>2</sub> with rodents in the laboratory have changed from a recommended 10% to 30% of the chamber or cage volume/min to a recommended 30% to 70% of the chamber or cage volume/min. The extensive literature used to make this recommendation is cited and the AVMA

appreciates the proactive efforts made by the international research community to provide the evidence needed to make this determination.

- Euthanasia techniques appropriate for use with rabbits raised for meat are categorized and described. This material is located in the Laboratory Animals section to place them with other techniques used with these species.
- The Animals Farmed for Food and Fiber section has been expanded to include American bison, water buffalo, camelids, and cervids. Updates to the application of captive bolt in several species have been made and new illustrations are available to assist veterinarians in proper usage.
- In the Avians section the recommendation for when avian embryos achieve the potential for perception has been amended from 50% to 80% of incubation for all avian eggs. This recommendation should be applied across avians with consideration for species-specific differences in development and using the best available data.

## 12.3 STATEMENT OF USE

The Guidelines are designed for use by members of the veterinary profession who carry out or oversee the euthanasia of animals. As such, they are intended to apply only to nonhuman species.

The species addressed by the practice of veterinary medicine are diverse. A veterinarian experienced with the species of interest should be consulted when choosing a method of euthanasia, particularly when little species-specific research on euthanasia has been conducted. Methods and agents selected will often be situation specific, as a means of minimizing potential risks to the animal's welfare and personnel safety. Given the complexity of issues that euthanasia presents, references on anatomy, physiology, natural history, husbandry, and other disciplines may assist in understanding how various methods may impact an animal during the euthanasia process.

Veterinarians performing or overseeing euthanasia must assess the potential for animal distress due to physical discomfort, abnormal social settings, novel physical surroundings, pheromones or odors from nearby or previously euthanized animals, the presence of humans, or other factors (including impact on the environment and other animals). In addition, human safety and perceptions, availability of trained personnel, potential infectious disease concerns, conservation or other animal population objectives, regulatory oversight that may be species specific, available equipment and facilities, options for disposal, potential secondary toxicity, and other factors must be considered. Human safety is of utmost importance, and appropriate safety equipment, protocols, and knowledge must be available before animals are handled. Advance preparation includes protocols and supplies for addressing personnel injury due to animal handling or exposure to drugs and equipment used during the process. Once eutha-

anasia has been carried out, death must be carefully verified. All laws and regulations pertaining to the species being euthanized, the methods employed, and the disposal of the animal's remains and/or any water containing pharmaceuticals used for euthanasia must be followed.

The POE's objective in creating the Guidelines is to provide guidance for veterinarians about how to prevent and/or relieve the pain and suffering of animals that are to be euthanized. While every effort has been made to identify and recommend appropriate approaches for common species encountered under common conditions, the POE recognized there will be less than perfect situations in which a recommended method of euthanasia may not be possible and a method or agent that is best under the circumstances will need to be applied. For this reason, although the Guidelines may be interpreted and understood by a broad segment of the general population, a veterinarian should be consulted in their application.

### 13 What Is Euthanasia?

Euthanasia is derived from the Greek terms *eu* meaning good and *thanatos* meaning death. The term is usually used to describe ending the life of an individual animal in a way that minimizes or eliminates pain and distress. A good death is tantamount to the humane termination of an animal's life.

In the context of these Guidelines, the veterinarian's *prima facie* duty in carrying out euthanasia includes, but is not limited to, (1) their humane disposition to induce death in a manner that is in accord with an animal's interest and/or because it is a matter of welfare, and (2) the use of humane techniques to induce the most rapid and painless and distress-free death possible. These conditions, while separate, are not mutually exclusive and are codependent.

Debate exists about whether *euthanasia* appropriately describes the killing of some animals at the end of biological experiments<sup>11</sup> and of unwanted shelter animals. The Panel believes that evaluating the social acceptability of various uses of animals and/or the rationale for inducing death in these cases is beyond its purview; however, current AVMA policy supports the use of animals for various human purposes,<sup>12</sup> and also recognizes the need to euthanize animals that are unwanted or unfit for adoption.<sup>13</sup> Whenever animals are used by humans, good animal care practices should be implemented and adherence to those good practices should be enforced. When evaluating our responsibilities toward animals, it is important to be sensitive to the context and the practical realities of the various types of human-animal relationships. Impacts on animals may not always be the center of the valuation process, and there is disagreement on how to account for conflicting interspecific interests. The Panel recognizes these are complex issues since how to bring about a "good death" for animals is regarded as "essentially contested" (morally and conceptually),<sup>14</sup> raising concerns across a large number

of domains, including scientific, ethical, economic, environmental, political, and social.

### 13.1 A GOOD DEATH AS A MATTER OF HUMANE DISPOSITION

Humane disposition reflects the veterinarian's desire to do what is best for the animal and serves to bring about the best possible outcome for the animal. Thus, euthanasia as a matter of humane disposition can be either intent or outcome based.

Euthanasia as a matter of humane disposition occurs when death is a welcome event and continued existence is not an attractive option for the animal as perceived by the owner and veterinarian. When animals are plagued by disease that produces insurmountable suffering, it can be argued that continuing to live is worse for the animal than death or that the animal no longer has an interest in living. The humane disposition is to act for the sake of the animal or its interests, because the animal will not be harmed by the loss of life. Instead, there is consensus that the animal will be relieved of an unbearable burden. As an example, when treating a companion animal that is suffering severely at the end of life due to a debilitating terminal illness, a veterinarian may recommend euthanasia, because the loss of life (and attendant natural decline in physical and psychological faculties) to the animal is not relatively worse compared with a continued existence that is filled with prolonged illness, suffering, and duress. In this case, euthanasia does not deprive the animal of the opportunity to enjoy more goods of life (ie, to have more satisfactions fulfilled or enjoy more pleasurable experiences). And, these opportunities or experiences are much fewer or lesser in intensity than the presence or intensity of negative states or affect. Death, in this case, may be a welcome event and euthanasia helps to bring this about, because the animal's life is not worth living but, rather, is worth avoiding.

Veterinarians may also be motivated to bring about the best outcome for the animal. Often, veterinarians face the difficult question of trying to decide (or helping the animal's owner to decide) when euthanasia would be a good outcome. In making this decision many veterinarians appeal to indices of welfare or quality of life. Scientists have described welfare as having 3 components: that the animal functions well, feels well, and has the capacity to perform behaviors that are innate or species-specific adaptations<sup>15-17</sup> (an alternative view is also available<sup>18</sup>). An animal has good welfare if, overall, its life has positive value for it. When an animal no longer continues to enjoy good welfare (when it no longer has a life worth living because, on balance, its life no longer has positive value for it, or will shortly be overcome by negative states), the humane thing to do is to give it a good death. Euthanasia relieves the animal's suffering, which is the desired outcome.

## 13.2 A GOOD DEATH AS A MATTER OF HUMANE TECHNIQUE

When the decision has been made to euthanize and the goal is to minimize pain, distress, and negative effect to the animal, the humaneness of the technique (ie, how we bring about the death of animals) is also an important ethical issue. As veterinarians and human beings it is our responsibility to ensure that if an animal's life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible. When euthanasia is the preferred option, the technique employed should result in rapid loss of consciousness followed by cardiac or respiratory arrest and, ultimately, a loss of brain function. In addition, animal handling and the euthanasia technique should minimize distress experienced by the animal prior to loss of consciousness. The POE recognized that complete absence of pain and distress cannot always be achieved. The Guidelines attempt to balance the ideal of minimal pain and distress with the reality of the many environments in which euthanasia is performed.

While recommendations are made, it is important for those utilizing these recommendations to understand that, in some instances, agents and methods of euthanasia identified as appropriate for a particular species may not be available or may become less than an ideal choice due to differences in circumstances. Conversely, when settings are atypical, methods normally not considered appropriate may become the method of choice. Under such conditions, the humaneness (or perceived lack thereof) of the method used to bring about the death of an animal may be distinguished from the intent or outcome associated with an act of killing. Following this reasoning, it may still be an act of euthanasia to kill an animal in a manner that is not perfectly humane or that would not be considered appropriate in other contexts. For example, due to lack of control over free-ranging wildlife and the stress associated with close human contact, use of a firearm may be the most appropriate means of euthanasia. Also, shooting a suffering animal that is in extremis, instead of catching and transporting it to a clinic to euthanize it using a method normally considered to be appropriate (eg, barbiturates), is consistent with one interpretation of a good death. The former method promotes the animal's overall interests by ending its misery quickly, even though the latter technique may be considered to be more acceptable under normal conditions.<sup>19</sup> Neither of these examples, however, absolves the individual from their responsibility to ensure that recommended methods and agents of euthanasia are preferentially used.

## 14 Euthanasia and Veterinary Medical Ethics

The AVMA has worked to ensure that veterinarians remain educated about public discourse around

animal ethics and animal welfare issues and that they are able to participate in meaningful ways. While an essential ingredient in public discourses about animals, sound science is by itself inadequate to address questions of ethics and values that surround the appropriate treatment of animals, especially as they relate to end-of-life issues. Since the 2013 edition, a number of authors<sup>20,21</sup> have probed in greater depth the issue of a good death for animals in both philosophical and ethical terms. To this end, and consistent with its charge, the POE hopes to provide veterinarians, those under their supervision, and the public with well-informed and credible arguments on how to approach the ethically important and sometimes complex issue of the death of an animal. In so doing, it hopes to promote greater understanding regarding the contexts or settings involving euthanasia and the complexity of end-of-life issues involving animals.

While not a regulatory body, the AVMA also hopes to offer guidance to those who may apply these Guidelines as part of regulatory structures designed to protect the welfare of animals used for human purposes. By creating and maintaining these Guidelines, the AVMA hopes to ensure that when a veterinarian or other professional intentionally kills an animal under their charge, it is done with respect for the interests of the animal and that the process is as humane as possible (ie, that it minimizes pain and distress to the animal and that death occurs as rapidly as possible).

The AVMA does not take the death of nonhuman animals lightly and attempts to provide guidance for its members on both the morality and practical necessity of the intentional killing of animals. Veterinarians, in carrying out the tenets of their Oath, may be compelled to bring about the intentional death of animals for a variety of reasons. The finality of death is, in part, what makes it an ethically important issue; death forever cuts off future positive states, benefits, or opportunities.<sup>22</sup> In cases where an animal no longer has a good life, however, its death also extinguishes permanently any and all future harms associated with poor welfare or quality of life.<sup>19</sup> What constitutes a good life and what counts as an impoverished life, or one that has limited quality such that the death of the animal is the most humane option, are research areas in need of further study by the veterinary and ethics communities.<sup>23,24</sup> Animal scientists and veterinarians are also investigating the processes by which an animal dies during the antemortem period and euthanasia methods and techniques that mitigate harmful effects.<sup>25-28</sup> Further research is also needed regarding the different contexts within which euthanasia occurs, so that improvements in the performance and outcomes of euthanasia can be made.

The intentional killing of healthy animals, as well as those that are impaired, is a serious concern for the public. When animals must be killed and veterinarians are called upon to assist, the AVMA encourages careful consideration of the decision to euthanize

and the method(s) used. This is also true for euthanasia carried out during the course of disease control or protection of public health, as a means of domestic or wild animal population control, in conjunction with animal use in biomedical research, and in the process of food and fiber production. Killing of healthy animals under such circumstances, while unpleasant and morally challenging, is a practical necessity. The AVMA recognizes such actions as acceptable if those carrying out euthanasia adhere to strict policies, guidelines, and applicable regulations.

In thinking seriously about veterinary medical ethics, veterinarians should familiarize themselves with the plurality of public moral views surrounding animal issues and also be cognizant of personal views and complicating factors that may impact their own ethical decision-making. While the Veterinarian's Oath,<sup>10</sup> Principles of Veterinary Medical Ethics of the AVMA,<sup>29</sup> state veterinary practice acts, and other guidance emanating from veterinary professional organizations and regulatory bodies provide direction for how veterinarians should interact with clients and their animals, different veterinarians may have different personal ethical values<sup>1,30</sup> and this may impact their recommendations.

In their capacity as animal advocate and client advisor, the precision and credibility of advice provided by veterinarians will help to advance client compliance. In many instances when veterinarians are called upon to benefit society through their scientific knowledge, practical experience, and understanding of how animals are benefited and harmed, straightforward answers may not be forthcoming. In such cases, veterinarians and animal welfare scientists may have to facilitate conscientious decision-making by promoting ethical dialogue.<sup>31-34</sup> As advisor and conduit for information (and while respecting the autonomy of their clients to make decisions on behalf of their animals), veterinarians should advance pertinent scientific knowledge and ethical concerns related to practices and procedures so that their clients and/or society can make informed decisions.<sup>1</sup>

Veterinarians who are committed to a broad understanding of the "do no harm" principle may have to determine whether an animal's life is worth living, especially when there is no consensus on when it is appropriate to let that life go. While welfare or quality of life is typically adopted as part of the assessment of an animal's interests, what is in an animal's interest need not be singularly identified with its welfare, especially if welfare is defined narrowly and if the animal is harmed more by its continued life than its death. For example, if welfare is defined solely in terms of an animal's subjective experience, euthanasia may be warranted even if the animal is not showing signs of suffering at the present time and if there is some commitment to avoid harm. Euthanasia may be considered to be the right course to spare the animal from what is to come (in conjunction with a more holistic or objective account of what is in an

animal's interest), if medical intervention would only prolong a terminal condition, or if current health conditions cannot be successfully mitigated. In these instances, intentional killing need not be motivated by narrow welfare-based interests<sup>35</sup> but may be connected to the overall value of death to the animal. That some animals are subjects-of-a-life,<sup>36-39</sup> and that human caretakers have moral responsibilities to their animals and do not want to see them endure continued harm,<sup>40,41</sup> may be factors in deciding whether death is in an animal's interest. (A subject-of-a-life is a being that is regarded as having inherent value and should not be treated as a mere means to an end. It is a being that possesses an internal existence and has needs, desires, preferences, and a psychosocial identity that extends through time.<sup>3,6</sup>)

In some cases (eg, animals used for research), intentional killing of the animal to minimize harm to it may be trumped by more pressing ends. Here, the decision to kill an animal and how to do so will be complicated by external factors, such as productivity, the greater public and general good, economics, and concern for other animals. In human-animal relationships there usually are other mitigating factors that are relevant besides ones pertaining only to animal welfare or the animal's interest(s). In laboratory situations, for example, where animals are employed as research subjects and death may be a terminal point, animal welfare considerations are balanced against the merits of the experimental design and merits of the research. In such cases, ensuring the respectful and humane treatment of research animals will be largely up to IACUCs. These committees must apply the principles of refinement, replacement, and reduction, and ensure a respectful death for research animals. The decision to induce death may also involve whether replacements can be created for the animals that are killed.<sup>42,43</sup> These other factors might justify killing an animal, despite the fact that the animal might otherwise have had a life worth living. For example, killing may be justified for disease control or public health purposes, population control, biomedical research, or slaughter for food and/or fiber. In other instances, keeping an animal alive that does not have a life worth living can be justified (eg, research circumstances where it would be impractical to kill the animal or when ensuring its survival would promote a greater good<sup>19</sup>).

There may be instances in which the decision to kill an animal is questionable, especially if the animal is predicted to have a life worth living if it is not killed. One example is the healthy companion animal whose owner wants to euthanize it because keeping it in the home is no longer possible or convenient. In this case, the veterinarian, as advisor and animal advocate, should be able to speak frankly about the animal's condition and suggest alternatives to euthanasia.

Prima facie, it is the ethical responsibility of veterinarians to direct animal owners toward euthanasia

as a compassionate treatment option when the alternative is prolonged and unrelenting suffering.<sup>44</sup> However, accommodating a pluralism of values, interests, and duties in animal ethics is challenging. This underscores the need for veterinarians to consider the broader context in thinking about what animal care she or he will prescribe. There are no easy reductionist formulas to which to appeal. In many cases, advice will need to be responsive to the needs at hand. Attention must be given to how the welfare and suffering of the animal are understood within the context of its whole life and in light of socially acceptable ways in which humans and animals interact in different environments.

Because veterinarians are committed to improving animal and human health and welfare, and because they work tirelessly to discover causes and cures for animal diseases and promote good animal management, some may feel a sense of disquiet or defeat when euthanasia becomes the better course of action. The POE hopes that these Guidelines and other AVMA policies will assist veterinarians who may be struggling with what may seem to be gratuitous euthanasia, the acceptability of certain procedures, and the sometimes routine nature of performing euthanasia. Toward that end, the decision aids in **Figures 1 and 2<sup>a</sup>** are offered as a resource.

## 15 Evaluating Euthanasia Methods

In evaluating methods of euthanasia, the POE considered the following criteria: (1) ability to induce loss of consciousness and death with a minimum of pain and distress; (2) time required to induce loss of consciousness; (3) reliability; (4) safety of personnel; (5) irreversibility; (6) compatibility with intended animal use and purpose; (7) documented emotional effect on observers or operators; (8) compatibility with subsequent evaluation, examination, or use of tissue; (9) drug availability and human abuse potential; (10) compatibility with species, age, and health status; (11) ability to maintain equipment in proper working order; (12) safety for predators or scavengers should the animal's remains be consumed; (13) legal requirements; and (14) environmental impacts of the method or disposition of the animal's remains.

Euthanasia methods are classified in the Guidelines as acceptable, acceptable with conditions, and unacceptable. Acceptable methods are those that consistently produce a humane death when used as the sole means of euthanasia. Methods acceptable with conditions are those techniques that may require certain conditions to be met to consistently produce humane death, may have greater potential for operator error or safety hazard, are not well documented in the scientific literature, or may require a secondary method to ensure death. Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method can be met. Unacceptable techniques are those methods deemed inhumane under any conditions or that

the POE found posed a substantial risk to the human applying the technique. The Guidelines also include information about adjunctive methods, which are those that should not be used as a sole method of euthanasia, but that can be used in conjunction with other methods to bring about euthanasia.

The POE recognized there will be less-than-perfect situations in which a method of euthanasia that is listed as acceptable or acceptable with conditions may not be possible, and a method or agent that is the best under the circumstances will need to be applied.

As with many other procedures involving animals, some methods of euthanasia require physical handling of the animal. The amount of control and kind of restraint required will be determined by the species, breed, and size of animal involved; the degree of domestication, tolerance to humans, level of excitement, and prior handling experience of the animal; the presence of painful injury or disease; the animal's social environment; and the method of euthanasia and competence of the person(s) performing the euthanasia. Proper handling is vital to minimize pain and distress in animals, to ensure the safety of the person performing euthanasia, and, often, to protect other people and animals. Handling animals that are not accustomed to humans or that are severely injured or otherwise compromised may not be possible without inducing stress, so some latitude in the means of euthanasia is needed in some situations. The POE discussed the criteria for euthanasia used in the Guidelines as they apply to circumstances when the degree of control over the animal makes it difficult to ensure death without pain and distress. Pre-medication with the intent of providing anxiolysis, analgesia, somnolence for easier and safer IV access, and reduction of stage II or postmortem activity that could be distressing to personnel is strongly encouraged to reduce animal distress and improve personnel safety. This is particularly important for prey species, nondomesticated species, and animals enduring painful conditions.

Personnel who perform euthanasia must demonstrate proficiency in the use of the technique in a closely supervised environment. Each facility or institution where euthanasia is performed (whether a clinic, laboratory, or other setting) is responsible for training its personnel adequately to ensure the facility or institution operates in compliance with federal, state, and local laws. Furthermore, experience in the humane restraint of the species of animal to be euthanized is important and should be expected, to ensure that animal pain and distress are minimized. Training and experience should include familiarity with the normal behavior of the species being euthanized, an appreciation of how handling and restraint affect that behavior, and an understanding of the mechanism by which the selected technique induces loss of consciousness and death. Euthanasia should only be attempted when the necessary drugs and supplies are available to ensure a smooth procedure.

Selection of the most appropriate method of euthanasia in any given situation depends on the species and number of animals involved, available means of animal restraint, skill of personnel, and other considerations. Information in the scientific literature and available from practical experience focuses primarily on domesticated animals, but the same general considerations should be applied to all species.

Euthanasia must be performed in accord with applicable federal, state, and local laws governing drug acquisition and storage, occupational safety, and methods used for euthanasia and disposal of animals, with special attention to species requirements where possible. The AVMA encourages those responsible for performing euthanasia of nonhuman animals to review current federal, state, and local regulations. If drugs have been used, careful consideration must be given to appropriate disposal of the animal's remains and steps should be taken to avoid environmental contamination or harm to other animals.

Circumstances may arise that are not clearly covered by the Guidelines. Whenever such situations arise, a veterinarian experienced with the species should apply professional judgment, knowledge of clinically acceptable techniques, professional ethos, and social conscience in selecting an appropriate technique for ending an animal's life.

It is imperative that death be verified after euthanasia and before disposal of the animal. An animal in deep narcosis following administration of an injectable or inhalant agent may appear to be dead, but might eventually recover. Death must be confirmed by examining the animal for cessation of vital signs. Consideration should be given to the animal species and method of euthanasia when determining appropriate criteria for confirming death.

Safe handling and disposal of the resulting animal remains are also critically important when the presence of zoonotic disease, foreign animal diseases, or other diseases of concern to population health is suspected. Appropriate diagnostic samples should be collected for testing, pertinent regulatory authorities should be notified, and the animal's body should be incinerated, if possible. Use of personal protective equipment and precautions for handling biohazardous materials are recommended. Animals that have injured humans may require specific actions to be taken depending on local and state laws.

## **15.1 CONSCIOUSNESS AND UNCONSCIOUSNESS**

Consciousness refers to the subjective or inner qualitative experience of an animal in question. In humans, consciousness is common during both sleep and anesthesia, as evidenced by dreaming.<sup>45</sup> One defining feature of dreaming is that, even while conscious, we do not experience our environment—we are disconnected from it. Ideally, general anesthesia prevents the experience of surgery and pain (connected consciousness), as well as producing behav-

ioral unresponsiveness, either by inducing unconsciousness or by disconnecting consciousness from the environment.<sup>45</sup>

Unconsciousness, defined as loss of individual awareness, occurs when the brain's ability to integrate information is blocked or disrupted. In humans, onset of anesthetic-induced unconsciousness has been functionally defined by loss of appropriate response to verbal command; in animals, by loss of the righting reflex.<sup>46,47</sup> This definition, introduced with the discovery of general anesthesia more than 160 years ago, is still useful because it is an easily observable, integrated whole-animal response.

Anesthetics produce unconsciousness either by preventing integration (blocking interactions among specialized brain regions) or by reducing information (shrinking the number of activity patterns available to cortical networks) received by the cerebral cortex or equivalent structure(s). Further, the abrupt loss of consciousness that occurs at a critical concentration of anesthetic implies that the integrated repertoire of neural states underlying consciousness may collapse nonlinearly.<sup>48</sup> Cross-species data suggest that memory and awareness are abolished with less than half the concentration required to abolish movement. Thus, an anesthetic state (unconsciousness and amnesia) can be produced at concentrations of anesthetic that do not prevent physical movements.<sup>47</sup>

Measurements of brain electrical function have been used to objectively quantify the unconscious state. At some level between behavioral unresponsiveness and the induction of a flat EEG (indicating the cessation of the brain's electrical activity and brain death), consciousness must vanish. However, EEG data cannot provide definitive answers as to onset of unconsciousness. Brain function monitors based on EEG are limited in their ability to directly indicate presence or absence of unconsciousness, especially around the transition point<sup>48</sup>; also, it is not always clear which EEG patterns are indicators of activation by stress or pain.<sup>28</sup>

Physical methods that destroy or render nonfunctional the brain regions responsible for cortical integration (eg, gunshot, captive bolt, cerebral electrocution, blunt force trauma, maceration) produce instantaneous unconsciousness. When physical methods directly destroy the brain, signs of unconsciousness include immediate collapse and a several-second period of tetanic spasm, followed by slow hind limb movements of increasing frequency<sup>49-51</sup> in cattle; however, there is species variability in this response. The corneal reflex will be absent.<sup>52</sup> Signs of effective electrocution are loss of righting reflex, loss of eye-blink and moving object tracking, extension of the limbs, opisthotonos, downward rotation of the eyeballs, and tonic spasm changing to clonic spasm, with eventual muscle flaccidity.<sup>53,54</sup>

Decapitation and cervical dislocation as physical methods of euthanasia require separate comment. The interpretation of brain electrical activity, which



can persist for up to 30 seconds following these methods,<sup>55-58</sup> has been controversial.<sup>59</sup> As indicated previously, EEG methods cannot provide definitive answers as to onset of unconsciousness. Other studies<sup>60-63</sup> indicate such activity does not imply the ability to perceive pain and conclude that loss of consciousness develops rapidly.

Once loss of consciousness occurs (ie, there is no longer an inner qualitative experience) subsequently observed activities, such as convulsions, vocalization, reflex struggling, breath holding, and tachypnea, can be attributed to the second stage of anesthesia, which by definition lasts from loss of consciousness to the onset of a regular breathing pattern.<sup>64,65</sup> Thus, events observed following loss of the righting reflex are likely not consciously perceived. Some agents may induce convulsions, but these generally follow loss of consciousness. Agents inducing convulsions prior to loss of consciousness are unacceptable for euthanasia.

### 15.1.1 A REVIEW

Sedatives and immobilizing agents should not be confused with anesthetics, since animals are not necessarily rendered unconscious by the former 2 agents. Sedated and immobilized animals may still be aware of their environment. During anesthesia, consciousness is not necessarily associated with connectedness, responsiveness, or even recall. The concept of a transition zone between consciousness and unconsciousness has been discussed by Terlouw et al.<sup>66,67</sup> This is especially true as it pertains to animals in slaughter plants. When animals are exsanguinated without stunning,<sup>68</sup> EEG studies<sup>69,70</sup> show that a corneal reflex in response to touch can occur in unconscious animals. To clarify assessment of unconsciousness and consciousness, it is recommended to separate signs of definite consciousness from signs of unconsciousness or death. Following this paragraph is a list of 6 signs that an animal is definitely conscious<sup>67</sup>; the subsequent paragraph is followed by a list of 3 signs that an animal is unconscious or (brain) dead. Consciousness likely depends on integrity of the corticothalamic networks. Spontaneous responsiveness may depend on subcortical and spinal cord networks and connectedness (namely, an awareness of one's environment) and may depend on continued information integration in corticothalamic circuits and unperturbed norepinephrinergic signaling.<sup>45,71</sup> According to Terlouw et al,<sup>67</sup> terrestrial animals are definitely conscious when they exhibit any 1 of these 6 indicators: standing posture, head or body righting reflex, voluntary vocalization, spontaneous blinking (no touching), eye pursuit, and response to threat or menace test (no touching). Some modification of these indicators may be required on the basis of factors such as species and developmental stage. A terrestrial animal that is unconscious and brain-dead will not have corneal reflex, eyelash reflex (in response to touch), or rhythmic breathing.<sup>67</sup> Determin-

ing similar indicators for other species of animals is desired, and research into them is highly encouraged to help practitioners distinguish between animals that are brain-dead, unconscious (by anesthesia), immobilized, or sedated. Following are the 6 indicators of definite consciousness, in list form:

- Standing posture.
- Head or body righting reflex.
- Voluntary vocalization.
- Spontaneous blinking (no touching).
- Eye pursuit.
- Response to threat or menace test (no touching).

Before carcass disposal or invasive dressing procedures occur at a slaughter plant, it should be confirmed that an animal is unconscious or brain-dead. Ensuring that an animal is unconscious or brain-dead requires all 3 of the following indicators:

- Absence of corneal reflex.
- Absence of eyelash reflex (response to touch).
- Absence of rhythmic breathing.<sup>67</sup>

### 15.2 PAIN AND ITS PERCEPTION

Criteria for painless death can be established only after the mechanisms of pain are understood. The perception of pain is defined as a conscious experience.<sup>47</sup> The International Association for the Study of Pain (IASP) describes pain as “[a]n unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Activity induced in the nociceptor and nociceptive pathways by a noxious stimulus is not pain, which is always a psychological state, even though we may well appreciate that pain most often has a proximate physical cause.”<sup>72</sup>

The perception of pain based on mammalian models requires nerve impulses from peripheral nociceptors to reach a functioning conscious cerebral cortex and the associated subcortical brain structures. Noxious stimulation that threatens to damage or destroy tissue produces activity in primary nociceptors and other sensory nerve endings. In addition to mechanical and thermal stimulation, a variety of endogenous substances can generate nociceptive impulses, including prostaglandins, hydrogen ions, potassium ions, substance P, purines, histamine, bradykinin, and leukotrienes, as can electrical currents.

Nociceptive impulses are conducted by nociceptor primary afferent fibers to either the spinal cord or the brainstem and 2 general sets of neural networks. Reflex withdrawal and flexion in response to nociceptive input are mediated at the spinal level while ascending nociceptive pathways carry impulses to the reticular formation, hypothalamus, thalamus, and cerebral cortex (somatosensory cortex and limbic system) for sensory processing and spatial localization. Thus, movement observed in response to nociception can be due to spinally mediated reflex activity, cerebral cortical and subcortical processing, or a combination of the two. For example, it is well recognized clinically that spinally mediated nociceptive

reflexes may remain intact distal to a compressive spinal lesion or complete spinal transection that blocks the ascending nociceptive pathways. In contrast, administration of a local anesthetic into the epidural space suppresses both spinally mediated nociceptive reflexes and ascending nociceptive pathways; in either case, noxious stimuli are not perceived as pain in conscious human or nonhuman animals because activity in the ascending pathways, and thus access to the higher cortical centers, is suppressed or blocked. It is therefore incorrect to substitute the term *pain* for stimuli, receptors, reflexes, or pathways because the term implies higher sensory processing associated with conscious perception. Consequently, the choice of a euthanasia agent or method is less critical if it is to be used on an animal that is anesthetized or unconscious, provided that the animal does not regain consciousness prior to death.

Pain is subjective in the sense that individuals can differ in their perceptions of pain intensity as well as in their physical and behavioral responses to it. Pain can be broadly categorized as sensory-discriminative, where the origin and the stimulus causing pain are determined, or as motivational-affective, where the severity of the stimulus is perceived and a response to it determined.<sup>73</sup> Sensory-discriminative nociceptive processing occurs within cortical and subcortical structures using mechanisms similar to those used to process other sensory-discriminatory input and provides information on stimulus intensity, duration, location, and quality. Motivational-affective processing involves the ascending reticular formation for behavioral and cortical arousal, as well as thalamic input to the forebrain and limbic system for perception of discomfort, fear, anxiety, and depression. Motivational-affective neural networks also provide strong inputs to the limbic system, hypothalamus, and autonomic nervous system for reflex activation of the cardiovascular, pulmonary, and pituitary-adrenal systems.

Although the perception of pain requires a conscious experience, defining consciousness, and therefore the ability to perceive pain, across many species is quite difficult. Previously it was thought that fish, amphibians, reptiles, and invertebrates lacked the anatomic structures necessary to perceive pain as we understand it in birds and mammals. For example, the invertebrate taxa include animals with no nervous system (eg, sponges) and nervous systems with no ganglionation or minimal ganglionation (eg, starfish). However, there are also invertebrate taxa with well-developed brains and/or complex behaviors that include the ability to analyze and respond to complex environmental cues (eg, octopus, cuttlefish, spiders,<sup>74,75</sup> honeybees, butterflies, ants). Most invertebrates do respond to noxious stimuli and many have endogenous opioids.<sup>76</sup>

Amphibians and reptiles also represent taxa with a diverse range of anatomic and physiologic characteristics such that it is often difficult to ascertain that an amphibian or reptile is, in fact, dead. Although

amphibians and reptiles respond to noxious stimuli and are presumed to feel pain, our understanding of their nociception and response to stimuli is incomplete. Nevertheless, there is increasing taxa-specific evidence of the efficacy of analgesics to minimize the impact of noxious stimuli on these species.<sup>77,78</sup> Consequently, euthanasia techniques that result in “rapid loss of consciousness” and “minimize pain and distress” should be strived for, even where it is difficult to determine that these criteria have been met.

Compelling recent evidence indicates finfish possess the components of nociceptive processing systems similar to those found in terrestrial vertebrates,<sup>59-65,72-80</sup> though debate continues based on questions of the impact of quantitative differences in numbers of specific components such as unmyelinated C fibers in major nerve bundles. Suggestions that fish responses to pain merely represent simple reflexes<sup>81</sup> have been refuted by studies<sup>82,83</sup> demonstrating forebrain and midbrain electrical activity in response to stimulation and differing with type of nociceptor stimulation. Learning and memory consolidation in trials where finfish are taught to avoid noxious stimuli have moved the issue of fish cognition and sentience forward<sup>84</sup> to the point where the preponderance of accumulated evidence supports the position that finfish should be accorded the same considerations as terrestrial vertebrates in regard to relief from pain. The POE was not able to identify similar studies of Chondrichthyes (cartilaginous fish), amphibians, reptiles, and invertebrates, but believes that available information suggests that efforts to relieve pain and distress for these taxa are warranted, unless further investigation disproves a capacity to feel pain or distress.

While there is ongoing debate about fishes', amphibians', reptiles', and invertebrate animals' ability to feel pain or otherwise experience compromised welfare, they do respond to noxious stimuli. Consequently, the Guidelines assume that a conservative and humane approach to the care of any creature is warranted, justifiable, and expected by society. Euthanasia methods should be employed that minimize the potential for distress or pain in all animal taxa, and these methods should be modified as new taxa-specific knowledge of their physiology and anatomy is acquired.

### 15.3 STRESS AND DISTRESS

An understanding of the continuum that represents stress and distress is essential for evaluating techniques that minimize any distress experienced by an animal being euthanized. Stress has been defined as the effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's homeostasis or adaptive state.<sup>85</sup> The response of an animal to stress represents the adaptive process that is necessary to restore the baseline mental and physiologic state. These responses may involve changes in an animal's neuroendocrinologic

system, autonomic nervous system, and mental status that may result in overt behavioral changes. An animal's response varies according to its experience, age, species, breed, and current physiologic and psychological state, as well as handling, social environment, and other factors.<sup>86,87</sup>

Stress and the resulting responses have been divided into 3 phases.<sup>88</sup> Eustress results when harmless stimuli initiate adaptive responses that are beneficial to the animal. Neutral stress results when the animal's response to stimuli causes neither harmful nor beneficial effects to the animal. Distress results when an animal's response to stimuli interferes with its well-being and comfort.<sup>89</sup> To avoid distress, veterinarians should strive to euthanize animals within the animals' physical and behavioral comfort zones (eg, preferred temperatures, natural habitat, home) and, when possible, prepare a calming environment.

## 15.4 ANIMAL BEHAVIOR

Although evaluations of euthanasia methods in the veterinary context are driven by science, clinical considerations and expectations from the public that high ethical standards will be observed may, in some cases, also play a role. When addressing euthanasia, veterinarians may disagree about what constitutes humane measures and a compassionate outcome for an animal or group of animals. This is reflective of the complexity or messiness of real-world situations veterinarians can sometimes find themselves in, where difficult decisions must be made involving euthanasia, and the multifaceted nature of animal welfare. In the latter case, conceptions of animal welfare are linked to varying normative approaches to how an animal is doing as described by different human assessors.<sup>b</sup> Here, this disagreement may not necessarily involve disagreements about empirical information or clinical measures but instead may be due to a values-based disagreement about what constitutes good animal welfare<sup>90</sup> or how an animal may be harmed or distressed by a particular clinical option. So, while the core issue concerning euthanasia is how to bring about a good death for an animal, a disagreement may persist among veterinarians about how to weigh or weight various social and clinical trade-offs. For example, there may be disagreement over whether a quick death with some short-lived but acute distress, aversion, or suffering is preferable to one where the animal becomes unconscious over a longer period of time but does not demonstrate much behavioral aversion. More specifically, veterinarians in the laboratory context may debate which type of inhalant to use or its optimal flow rate to get rodents quicker to death or which can be anxiety producing and may not create a desired anesthetic state in the animal. Furthermore, depending on which conception of welfare is emphasized, behavioral aversion as an indicator of poor animal welfare may be viewed as problematic by some but not others if, for example, more weight is given to the intensity of negative states

experienced by an animal instead of the duration of exposure to a noxious agent. Measures designed to minimize pain or distress before animals become unconscious will likely achieve widespread support only if veterinarians are sensitive to the variety of conceptions of animal welfare and are willing to engage openly about how animals may be impacted by various alternatives. In the context of laboratory animals, for example, resolution of a disagreement in emphasis or interpretation regarding affective states, basic functioning, and evidence of frustration, anxiety, or fear will likely be influenced by programmatic policies and practices that have been identified by the institution's IACUC as ensuring high animal welfare standards.

The need to minimize animal distress, including negative affective or experientially based states like fear, aversion, anxiety, and apprehension, must be considered in determining the method of euthanasia. Ethologists and animal welfare scientists are getting better at discerning the nature and content of these states. Veterinarians and other personnel involved in performing euthanasia should familiarize themselves with pre-euthanasia protocols and be attentive to species and individual variability. For virtually all animals, being placed in a novel environment is stressful<sup>91-94</sup>; therefore, a euthanasia approach that can be applied in familiar surroundings may help reduce stress.

For animals accustomed to human contact, gentle restraint (preferably in a familiar and safe environment), careful handling, and talking during euthanasia often have a calming effect and may also be effective coping strategies for personnel.<sup>95</sup> Sedation and/or anesthesia may assist in achieving the best conditions for euthanasia. It must be recognized that sedatives or anesthetics given at this stage that change circulation may delay the onset of the euthanasia agent.

Animals that are in social groups of conspecifics or that are wild, feral, injured, or already distressed from disease pose another challenge. For example, mammals and birds that are not used to being handled have higher corticosteroid levels during handling and restraint compared with animals accustomed to frequent handling by people.<sup>96-98</sup> For example, beef cattle that are extensively raised on pasture or range have higher corticosteroid levels when restrained in a squeeze chute compared with intensively raised dairy cattle that are always in close association with people,<sup>99,100</sup> and being placed in a new cage has been shown to be stressful for rodents.<sup>101</sup> Because handling may be a stressor for animals less accustomed to human contact (eg, wildlife, feral species, zoo animals, and some laboratory animals), the methods of handling and degree of restraint (including none, such as for gunshot) required to perform euthanasia should be considered when evaluating various methods.<sup>86</sup> When handling such animals, calming may be accomplished by retaining them (as much as possible) in familiar environments, and by minimizing visual,

auditory, and tactile stimulation. When struggling during capture or restraint may cause pain, injury, or anxiety to the animal or danger to the operator, the use of tranquilizers, analgesics, and/or anesthetics may be necessary. A method of administration should be chosen that causes the least distress in the animal for which euthanasia must be performed. Various techniques for oral delivery of sedatives to dogs and cats have been described that may be useful under these circumstances.<sup>102,103</sup>

Expressions and body postures that indicate various emotional states of animals have been described for some species.<sup>104-107</sup> Behavioral responses to noxious stimuli in conscious animals include distress vocalization, struggling, attempts to escape, and defensive or redirected aggression. In cattle and pigs, vocalization during handling or painful procedures is associated with physiologic indicators of stress.<sup>108-110</sup> Vocalization is associated with excessive pressure applied by a restraint device.<sup>111,112</sup> Salivation, urination, defecation, evacuation of anal sacs, pupillary dilatation, tachycardia, sweating, and reflex skeletal muscle contractions causing shivering, tremors, or other muscular spasms may occur in unconscious as well as conscious animals. Fear can cause immobility or playing dead in certain species, particularly rabbits and chickens.<sup>113</sup> This immobility response should not be interpreted as loss of consciousness when the animal is, in fact, conscious. Distress vocalizations, fearful behavior, and release of certain odors or pheromones by a frightened animal may cause anxiety and apprehension in other animals.<sup>114,115</sup> Therefore, for sensitive species, it is desirable that other animals not be present when individual animal euthanasia is performed. Often, simple environmental modifications can help reduce agitation and stress, such as providing a non-slip floor for the animals to stand on, reducing noise, blocking the animal's vision with a blindfold or a barrier, or removing distracting stimuli that cause animals to become agitated.<sup>112,116-119</sup>

## 15.5 HUMAN BEHAVIOR

The depth of the emotional attachment between animals and their owners or caretakers requires an additional layer of professional respect and care beyond the ethical obligation to provide a good death for the animal. Human concerns associated with the euthanasia of healthy and unwanted animals can be particularly challenging, as can situations where the health interests of groups of animals and/or the health interests of people conflict with the welfare of individual animals (eg, animal health emergencies).

The human-animal relationship should be respected by discussing euthanasia openly,<sup>120</sup> providing an appropriate place to conduct the process, offering the opportunity for animal owners and/or caretakers to be present when at all possible (consistent with the best interests of the animal and the owners and caretakers), fully informing those present about what they will see (including possible unpleasant side ef-

fects), and giving emotional support and information about grief counseling as needed.<sup>121-123</sup> Regardless of the euthanasia method chosen, it is important to consider the level of understanding and perceptions of those in attendance as they witness euthanasia. When death has been achieved and verified, owners and caretakers should be verbally notified.<sup>122</sup>

Owners and caretakers are not the only people affected by the euthanasia of animals. Veterinarians and their staffs may also become attached to patients and struggle with the ethics of the caring-killing paradox,<sup>124,125</sup> particularly when they must end the lives of animals they have known and treated for many years. Repeating this scenario regularly may lead to emotional burnout, or compassion fatigue. The various ways in which veterinarians cope with euthanasia have been discussed elsewhere.<sup>126</sup>

There are 6 settings in which the Panel was most aware of the potential for substantive psychological impacts of animal euthanasia on people.

The first setting is the veterinary clinical setting (clinics and hospitals or mobile veterinary practices) where owners have to make decisions about whether and when to euthanize. Although many owners rely heavily on their veterinarian's judgment, others may have misgivings about making a decision. This is particularly likely if an owner feels responsible for an animal's medical or behavioral problem. Owners choose euthanasia for their animals for a variety of reasons, including prevention of suffering from a terminal illness, their inability to care for the animal, the impact of the animal's condition on other animals or people, and/or financial considerations. The decision to euthanize often carries strong feelings of emotion such as guilt, sadness, shock, and disbelief.<sup>127</sup> As society continues to pay more attention to questions about the moral status of animals, loss of animal life should be handled with the utmost respect and compassion by all animal care staff. The ability to communicate well is crucial to helping owners make end-of-life decisions for their animals and is a learned skill that requires training.<sup>128</sup>

Almost 80% of clients who recently experienced the death of a pet (87% by euthanasia) reported a positive correlation between support from the veterinarian and staff and their ability to handle the grief associated with their pet's death.<sup>127</sup> Owners should be given the opportunity to be present during euthanasia, when feasible, and they should be prepared for what to expect.<sup>122,127,129</sup> What drugs are being used and how the animal could respond should be discussed. Behaviors such as vocalization, agonal breaths, muscle twitches, failure of the eyelids to close, urination, or defecation can be distressing to owners. Counseling services for owners having difficulty coping with animal death are available in some communities, and veterinarians are encouraged to seek grief support training to assist their clients.<sup>130-132</sup> While good euthanasia practices (ie, client communication and education, compassionate species-appropriate handling

and selection of technique, pre-euthanasia sedatives or anesthetics as needed to minimize anxiety and facilitate safe restraint, and careful confirmation of death) are often applied in the euthanasia of dogs and cats, they should also be followed for other species that are kept as pets, including small mammals, birds, reptiles, farm animals, and aquatic animals.

The second setting is in animal care and control facilities where unwanted, homeless, diseased, and injured animals must be euthanized in large numbers. The person performing euthanasia must be technically proficient (including the use of humane handling methods and familiarity with the method of euthanasia being employed), and must be able to understand and communicate to others the reasons for euthanasia and why a particular approach was selected. This requires organizational commitment to provide ongoing professional training on the latest methods, techniques, and materials available for euthanasia.

Distress may develop among personnel directly involved in performing euthanasia repeatedly,<sup>133</sup> and may include a psychological state characterized by a strong sense of work dissatisfaction or alienation, which may be expressed by absenteeism, belligerence, or careless and callous handling of animals.<sup>134</sup> The impact on personnel may be worse when euthanasia is conducted in frequent, shorter sessions compared with fewer, longer sessions.<sup>135</sup> In addition, animal shelter personnel have been shown to have more difficulty dealing emotionally with the euthanasia of healthy, unwanted animals than those that are old, sick, injured, or wild.<sup>136</sup> Specific coping strategies that can make the task more tolerable include adequate training programs so that euthanasia is performed competently, rotation of duties and shared responsibilities for staff performing euthanasia, peer support in the workplace, professional support as necessary, focusing on animals that are successfully adopted or returned to owners, devoting some work time to educational activities, and providing time off when workers feel distressed. Management should be aware of potential personnel problems related to animal euthanasia and determine whether it is necessary to institute a program to prevent, decrease, or eliminate this problem.

The third setting is the laboratory. Researchers, technicians, and students may become attached to animals that must be euthanized in laboratory settings, even though the animals are often purpose-bred for research.<sup>137</sup> The human-research animal bond positively impacts quality of life for a variety of research animals, but those caring for the animals often experience euthanasia-related stress symptoms comparable to those encountered in veterinary clinics and animal shelters.<sup>138-140</sup> The same considerations afforded pet owners or shelter employees should be provided to those working in laboratories, particularly the provision of training to promote grief coping skills.<sup>141</sup>

The fourth setting is wildlife conservation and

management. Wildlife biologists, wildlife managers, and wildlife health professionals are often responsible for euthanizing animals that are injured, diseased, or in excessive number or those that threaten property or human safety. Although relocation of some animals may be appropriate and attempted, relocation is often only a temporary solution and may be insufficient to address a larger problem. People who must deal with these animals, especially under public pressure to save the animals rather than destroy them, can experience extreme distress and anxiety. In addition, the perceptions of not only the wildlife professionals, but of onlookers, need to be considered when selecting a euthanasia method.

The fifth setting is livestock and poultry production. As for shelter and laboratory animal workers, on-farm euthanasia of individual animals by farm workers charged with nurturing and raising production animals can take a heavy toll on employees both physically and emotionally.<sup>142</sup>

The sixth setting is that in which there is broad public exposure. Because euthanasia of zoo animals, animals involved in roadside or racetrack accidents, stranded marine animals, and nuisance or injured wildlife can draw public attention, human attitudes and responses must be considered whenever these animals are euthanized. Natural disasters and foreign animal disease programs also present public challenges. Attention to public perceptions, however, should not outweigh the primary responsibility of doing what is in the animal's best interest under the circumstances (ie, using the most appropriate and painless euthanasia method possible).

In addition to ensuring good care of animals during euthanasia and considering the psychological well-being of human participants, the physical safety of personnel handling the animals and performing euthanasia needs to be protected. The safe use of controlled substances and diversion control to prevent abuse is also part of the responsibility of those using such substances in the performance of euthanasia.<sup>143</sup>

## **15.6 SEDATION VERSUS ANESTHESIA**

A distinction must be made between the terms sedation, tranquilization, and anesthesia as utilized in these Guidelines. A common characteristic of both sedatives and tranquilizers is that arousal to a conscious state can occur with sufficient stimulation, such that animals sedated or immobilized with these agents may still be consciously aware of, and connected to, their environment. Unlike properly applied physical euthanasia methods where loss of consciousness is instantaneous and unambiguous (eg, captive bolt, gunshot, electrocution), application of other approved euthanasia methods requires animals be first rendered fully unconscious (eg, intracardiac pentobarbital, IV MgSO<sub>4</sub> or KCl, exsanguination). While sedatives, hypnotics, and tranquilizers, when administered in sufficient quantity, can produce a sleep-like state, humans may recall connected aware-

ness of their environment, and the same is likely true for animals. Indeed, humans experienced connected awareness of their environment during sedation with dexmedetomidine sufficient to lose responsiveness,<sup>144</sup> and a state of surgical anesthesia could not be produced even when xylazine was administered at 55 to 88 times the usual dose (0.1 mg/kg [0.05 mg/lb]) required to produce recumbency in cattle.<sup>c</sup> Immobilizing, tranquilizing, or sedative agents should not be relied on to produce a truly unresponsive, disconnected unconscious state, regardless of the dose administered. Instead, an effective dose of a general anesthetic should be used when performing euthanasia with methods causing distress or noxious stimulation prior to loss of consciousness.

## 16 Mechanisms of Euthanasia

Euthanizing agents cause death by 3 basic mechanisms: (1) direct depression of neurons necessary for life function, (2) hypoxia, and (3) physical disruption of brain activity. The euthanasia process should minimize or eliminate pain, anxiety, and distress prior to loss of consciousness. As loss of consciousness resulting from these mechanisms can occur at different rates, the suitability of a particular agent or method will depend on whether an animal experiences distress prior to loss of consciousness.

Unconsciousness, defined as loss of individual awareness, occurs when the brain's ability to integrate information is blocked or disrupted (see comments on unconsciousness for additional information). Ideally, euthanasia methods should result in rapid loss of consciousness, followed by cardiac or respiratory arrest and the subsequent loss of brain function. Loss of consciousness should precede loss of muscle movement. Agents and methods that prevent movement through muscle paralysis, but that do not block or disrupt the cerebral cortex or equivalent structures (eg, succinylcholine, strychnine, curare, nicotine, potassium, or magnesium salts), are not acceptable as sole agents for euthanasia of vertebrates because they result in distress and conscious perception of pain prior to death. In contrast, magnesium salts are acceptable as the sole agent for euthanasia in many invertebrates due to the absence of evidence for cerebral activity in some members of these taxa,<sup>145,146</sup> and there is evidence that the magnesium ion acts centrally in suppressing neural activity of cephalopods.<sup>147</sup>

Depression of the cortical neural system causes loss of consciousness followed by death. Depending on the speed of onset of the particular agent or method used, release of inhibition of motor activity may be observed accompanied by vocalization and muscle contraction similar to that seen in the initial stages of anesthesia. Although distressing to observers, these responses do not appear to be purposeful. Once ataxia and loss of righting reflex occur, subsequent observed motor activity, such as convulsions, vocalization, and reflex struggling, can be attributed

to the second stage of anesthesia, which by definition lasts from the loss of consciousness to the onset of a regular breathing pattern.<sup>64,65</sup>

Hypoxia is commonly achieved by exposing animals to high concentrations of gases that displace oxygen (O<sub>2</sub>), such as carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), or argon (Ar), or by exposure to carbon monoxide (CO) to block uptake of O<sub>2</sub> by RBCs. Exsanguination, an adjunctive method, is another method of inducing hypoxia, albeit indirectly, and can be a way to ensure death in an already unconscious or moribund animal. As with other euthanasia methods, some animals may exhibit motor activity or convulsions following loss of consciousness due to hypoxia; however, this is reflex activity and is not consciously perceived by the animal. In addition, methods based on hypoxia will not be appropriate for species that are tolerant of prolonged periods of hypoxemia.

Physical disruption of brain activity can be produced through a blow to the skull resulting in concussive stunning; through direct destruction of the brain with a captive bolt, bullet, or pithing rod; or through depolarization of brain neurons following electrocution. Death quickly follows when the midbrain centers controlling respiration and cardiac activity fail. Convulsions and exaggerated muscle activity can follow loss of consciousness. Physical disruption methods are often followed by exsanguination. These methods are inexpensive, humane, and painless if performed properly, and leave no drug residues in the animal's remains. Furthermore, animals presumably experience less fear and anxiety with methods that require little preparatory handling. However, physical methods usually require a more direct association of the operator with the animals to be euthanized, which can be offensive to, and upsetting for, the operator. Physical methods must be skillfully executed to ensure a quick and humane death, because failure to do so can cause substantial suffering.

In summary, the cerebral cortex or equivalent structure(s) and associated subcortical structures must be functional for pain to be perceived. If the cerebral cortex is nonfunctional because of neuronal depression, hypoxia, or physical disruption, pain is not experienced. Reflex motor activity that may occur following loss of consciousness, although distressing to observers, is not perceived by the animal as pain or distress. Given that we are limited to applying euthanasia methods based on these 3 basic mechanisms, efforts should be directed toward educating individuals involved in the euthanasia process, achieving technical proficiency, and refining the application of existing methods.<sup>148</sup>

## 17 Confirmation of Death

Death must be confirmed before disposal of any animal remains. A combination of criteria is most reliable in confirming death, including lack of pulse, breathing, corneal reflex, and response to firm toe pinch; inability to hear respiratory sounds and heart-

beat by use of a stethoscope; grayng of the mucous membranes; and rigor mortis. None of these signs alone, except rigor mortis, confirms death.

In small animals, particularly in animal shelter settings, verification of death may be supplemented by percutaneous cardiac puncture after the animal is unconscious. Failure of the needle and attached syringe to move after insertion into the heart (aspiration of blood provides evidence of correct location) indicates lack of cardiac muscle movement and death.<sup>149</sup>

## 18 Disposal of Animal Remains

Regardless of the euthanasia method chosen, animal remains must be handled appropriately and in accord with state and local law. Regulations apply not only to the disposition of the animal's remains (eg, burial, incineration, rendering), but also to the management of chemical residues (eg, pharmaceuticals [including but not limited to barbiturates, such as pentobarbital] and other residues, such as lead) that may adversely affect scavengers or result in the adulteration of rendered products used for animal feed.

Use of pentobarbital invokes legal responsibilities for veterinarians, animal shelters, and animal owners to properly dispose of animal remains after death. Animal remains containing pentobarbital are potentially poisonous for scavenging wildlife, including birds (eg, bald and golden eagles, vultures, hawk species, gulls, crows, ravens), carnivorous mammals (eg, bears, coyotes, martens, fishers, foxes, lynxes, bobcats, cougars), and domestic dogs.<sup>150</sup> Federal laws protecting many of these species apply to secondary poisoning from animal remains containing pentobarbital. The Migratory Bird Treaty Act, the Endangered Species Act, and the Bald and Golden Eagle Protection Act may carry civil and criminal penalties, with fines in civil cases up to \$25,000 and in criminal cases up to \$500,000 and incarceration for up to 2 years.<sup>150</sup> Serious repercussions may occur when veterinary health professionals who should be well-informed about the necessity for proper disposal of animal remains fail to provide it, or fail to inform their clients how to provide it, whether there was intent to cause harm or not.<sup>151,152</sup> Cases of suspected wildlife death from animal remains containing pentobarbital are investigated by the regional US Fish and Wildlife Service law enforcement office.

Recommendations by the US Fish and Wildlife Service for prevention of secondary poisoning from pentobarbital are to (1) incinerate or cremate animal remains whenever possible, (2) immediately bury deeply according to local laws and regulations, (3) securely cover or store animal remains if the ground is frozen until such time as deep burial is practical, (4) review and modify local landfill practices to prevent access of scavengers to legally disposed animal remains, (5) educate clients about proper disposal, (6) include a warning regarding disposal of animal remains on the euthanasia consent form, and (7) tag

animal remains and outer bags or containers with prominent poison tags.<sup>150</sup>

Rendering is an important means of disposal of dead livestock and horses, and since many horses are euthanized with barbiturates, related residues can be hazardous. Rendered protein is used in animal feed for cattle, swine, poultry, fish, and companion animals, but products rendered from ruminants are prohibited by law for use in ruminant feed. Many pet food manufacturers have lowered their acceptance thresholds for barbiturate concentrations in rendered product. Advances in analytical chemistry have spawned increasingly sensitive assays, and pet food manufacturers are using these techniques to ensure the purity of the rendered protein incorporated in their products. Accordingly, increased analytical sensitivity has led many renderers to reconsider accepting horses euthanized using barbiturates. This places renderers and those wishing to employ rendering as a means of disposal for animals euthanized using pentobarbital in a difficult position, and may result in renderers being reluctant to accept more animal remains than they can reasonably manage without creating residue concerns. Alternatives for disposal of animal remains must be considered in advance, in case the renderer cannot or will not accept animal remains containing barbiturate residues.

Composting is another means of disposing of animal remains that is becoming increasingly common. Studies examining the persistence of barbiturate residues in composted animal remains are few, but those that do exist suggest the persistence of the drugs in composted material. While the implications of this are still unclear, it does raise questions about potential environmental impacts in the case of animal health emergencies or mass mortality events.

Alternatives to the use of pentobarbital that may reduce the risk of secondary toxicity include general anesthesia followed by nontoxic injectable agents such as potassium chloride, or the application of physical methods such as PCB or gunshot. These alternatives, however, are not risk free. For example, pharmaceutical residues in animal remains other than barbiturates (eg, xylazine) may affect scavengers and can reduce the acceptability of the animal remains for renderers. Unfortunately, specific guidance from regulators regarding the use of such alternatives is limited.

The persistence of antimicrobials in animal remains presents parallel concerns, particularly for animal remains that will be rendered. While many antimicrobials may be inactivated or destroyed through the rendering process, public health concerns associated with antimicrobial resistance, coupled with the enhanced sensitivity of chemical assays and limited regulatory guidance for renderers, further complicate veterinarians' responsibilities for safe remediation.

Safe handling and disposal of the resulting animal remains are also critically important when zoonotic diseases, foreign animal diseases, or diseases

of concern to population health are suspected. Appropriate diagnostic samples should be collected for testing, regulatory authorities must be contacted, and the animal remains must be incinerated (if possible). Personal protective equipment and precautions for handling biohazardous materials are recommended. Animals that have injured humans may require specific actions to be taken depending on local and state laws.

## 19 Footnotes

- a. Anthony R, University of Alaska Anchorage, Anchorage, Alaska: Personal communication, 2011.
- b. Fraser D. Understanding animal welfare (abstr). *Acta Vet Scand* 2008;50(suppl 1):S1.
- c. Dewell RD, Bergamasco LL, Kelly CK, et al. Clinical study to assess the level of unconsciousness in cattle following the administration of high doses of xylazine hydrochloride (abstr), in *Proceedings*. 46th Annu Conf Am Assoc Bovine Pract 2013;183.

## 110 References

1. Sandoe P, Christiansen SB. *Ethics of animal use*. Chichester, England: Wiley-Blackwell, 2008;1-14, 15-32, 49-66.
2. Rollin BE. Animal agriculture and emerging social ethics for animals. *J Anim Sci* 2004;82:955-964.
3. DeGrazia D. Self-awareness in animals. In: Lurz R, ed. *The philosophy of animal minds*. Cambridge, England: Cambridge University Press, 2009;201-217.
4. Thompson PB. Ethics on the frontiers of livestock science. In: Swain DL, Charmley E, Steel JW, et al, eds. *Redesigning animal agriculture: the challenge of the 21st century*. Cambridge, Mass: CAB International, 2007;30-45.
5. Thompson PB. Getting pragmatic about farm animal welfare. In: McKenna E, Light A, eds. *Animal pragmatism: rethinking human-nonhuman relationships*. Bloomington, Ind: Indiana University Press, 2004;140-159.
6. DeGrazia D. Animal ethics around the turn of the twenty-first century. *J Agric Environ Ethics* 1999;11:111-129.
7. DeGrazia D. *Taking animals seriously: mental life and moral status*. Cambridge, England: Cambridge University Press, 1996.
8. Thompson PB. *Agricultural ethics: research, teaching, and public policy*. Ames, Iowa: Iowa State University Press, 1998.
9. Varner G. *In nature's interests? Interests, animal rights and environmental ethics*. Oxford, England: Oxford University Press, 1998.
10. AVMA. Veterinarian's oath. Available at [www.avma.org/about\\_avma/whowere/oath.asp](http://www.avma.org/about_avma/whowere/oath.asp). Accessed May 13, 2011.
11. Pavlovic D, Spasov A, Lehmann C. Euthanasia: in defense of a good, ancient word. *J Clin Res Bioeth* 2011;2:105.
12. AVMA. AVMA animal welfare principles. Available at: [www.avma.org/issues/policy/animal\\_welfare/principles.asp](http://www.avma.org/issues/policy/animal_welfare/principles.asp). Accessed May 7, 2011.
13. AVMA. Euthanasia of animals that are unwanted or unfit for adoption. Available at: [www.avma.org/issues/policy/animal\\_welfare/euthanasia.asp](http://www.avma.org/issues/policy/animal_welfare/euthanasia.asp). Accessed May 7, 2011.
14. uAin Q, Whiting TL. Is a "good death" at the time of animal slaughter an essentially contested concept? *Animals (Basel)* 2017;7:99.
15. Haynes R. *Animal welfare: competing conceptions and their ethical implications*. Dordt, Netherlands: Springer, 2008.
16. Appleby MC. *What should we do about animal welfare?* Oxford, England: Blackwell, 1999.
17. Fraser D, Weary DM, Pajor EA, et al. A scientific conception of animal welfare that reflects ethical concerns. *Anim Welf* 1997;6:187-205.
18. Duncan IJH. Animal welfare defined in terms of feelings. *Acta Agric Scand. Anim Sci* 1996;(suppl 27):29-35.
19. Yeates J. Death is a welfare issue. *J Agric Environ Ethics* 2010;23:229-241.
20. Višak T, Garner R, Singer P. *The ethics of killing animals*. Oxford, England: Oxford University Press, 2016.
21. Meijboom FLB, Stassen EN. *The end of animal life: a start for ethical debate. Ethical and societal considerations on killing animals*. Wageningen, Netherlands: Wageningen Academic Publishers, 2016.
22. Kamm FM. *Morality, mortality*. Vol 1. Oxford, England: Oxford University Press, 1993.
23. Morton DB. A hypothetical strategy for the objective evaluation of animal well-being and quality of life using a dog model. *Anim Welf* 2007;16(suppl):75-81.
24. Rollin BE. Animal euthanasia and moral stress. In: Kay WJ, Cohen SP, Fudin CE, et al, eds. *Euthanasia of the companion animal*. Philadelphia: Charles Press, 1988;31-41.
25. Niel L, Stewart SA, Weary DM. Effect of flow rate on aversion to gradual-fill carbon dioxide euthanasia in rats. *Appl Anim Behav Sci* 2008;109:77-84.
26. Brown M, Carbone L, Conlee KM, et al. Report of the working group on animal distress in the laboratory. *Lab Anim (NY)* 2006;35:26-30.
27. Demers G, Griffin G, DeVroey G, et al. Animal research. Harmonization of animal care and use guidelines. *Science* 2006;312:700-701.
28. Hawkins P, Playle L, Golledge H, et al. Newcastle consensus meeting on carbon dioxide euthanasia of laboratory animals. London: National Centre for the Replacement, Refinement and Reduction of Animals in Science, 2006. Available at: [www.nc3rs.org.uk/downloaddoc.asp?id=416&page=292&skin=0](http://www.nc3rs.org.uk/downloaddoc.asp?id=416&page=292&skin=0). Accessed Jan 20, 2011.
29. AVMA. Principles of veterinary medical ethics of the AVMA. Available at: [www.avma.org/issues/policy/ethics.asp](http://www.avma.org/issues/policy/ethics.asp). Accessed May 13, 2011.
30. Rollin BE. *An introduction to veterinary medical ethics*. 2nd ed. Ames, Iowa: Blackwell, 2006.
31. Croney CC, Anthony R. Engaging science in a climate of values: tools for animal scientists tasked with addressing ethical problems. *J Anim Sci* 2010;88(suppl 13):E75-E81.
32. Sandoe P, Christiansen SB, Appleby MC. Farm animal welfare: the interaction of ethical questions and animal welfare science. *Anim Welf* 2003;12:469-478.
33. Fraser D. Animal ethics and animal welfare science: bridging the two cultures. *Appl Anim Behav Sci* 1999;65:171-189.
34. Thompson PB. From a philosopher's perspective, how should animal scientists meet the challenge of contentious issues? *J Anim Sci* 1999;77:372-377.
35. Webster J. *Animal welfare: a cool eye towards Eden*. Oxford, England: Blackwell, 1994.
36. Anderson E. Animal rights and the values of nonhuman life. In: Sunstein C, Nussbaum M, eds. *Animal rights: current debates and new directions*. Oxford, England: Oxford University Press, 2004;277-298.
37. Regan T. *Animal rights, human wrongs: an introduction to moral philosophy*. Lanham, Md: Rowman and Littlefield, 2003.
38. Pluhar E. *Beyond prejudice*. Durham, NC: Duke University Press, 1995.
39. Regan T. *The case for animal rights*. Berkeley, Calif: University of California Press, 1983.
40. Anthony R. Ethical implications of the human-animal bond on the farm. *Anim Welf* 2003;12:505-512.
41. Burgess-Jackson K. Doing right by our animal companions. *J Ethics* 1998;2:159-185.
42. Frey R. *Rights, killing and suffering*. Oxford, England: Blackwell, 1983.
43. Singer P. *Practical ethics*. Cambridge: Cambridge University Press, 1978.
44. Rollin BE. The use and abuse of Aesculapian authority in veterinary medicine. *J Am Vet Med Assoc* 2002;220:1144-1149.
45. Sanders RD, Tononi G, Laureys S, et al. Unresponsiveness ≠ unconsciousness. *Anesthesiology* 2012;116:946-959.
46. Hendrickx JF, Eger II EI, Sonner JM, et al. Is synergy the rule?



- A review of anesthetic interactions producing hypnosis and immobility. *Anesth Analg* 2008;107:494–506.
47. Antognini JF, Barter L, Carstens E. Overview: movement as an index of anesthetic depth in humans and experimental animals. *Comp Med* 2005;55:413–418.
  48. Alkire MT, Hudetz AG, Tononi G. Consciousness and anesthesia. *Science* 2008;322:876–880.
  49. Gregory NG. Animal welfare at markets and during transport and slaughter. *Meat Sci* 2008;80:2–11.
  50. Finnie JW. Neuropathologic changes produced by non-penetrating percussive captive bolt stunning of cattle. *N Z Vet J* 1995;43:183–185.
  51. Blackmore DK, Newhook JC. The assessment of insensibility in sheep, calves and pigs during slaughter. In: Eikelenboom G, ed. *Stunning of animals for slaughter*. Boston: Martinus Nijhoff Publishers, 1983;13–25.
  52. Gregory NG, Lee CJ, Widdicombe JP. Depth of concussion in cattle shot by penetrating captive bolt. *Meat Sci* 2007;77:499–503.
  53. Vogel KD, Badtram G, Claus JR, et al. Head-only followed by cardiac arrest electrical stunning is an effective alternative to head-only electrical stunning in pigs. *J Anim Sci* 2011;89:1412–1418.
  54. Blackmore DK, Newhook JC. Electroencephalographic studies of stunning and slaughter of sheep and calves. 3. The duration of insensibility induced by electrical stunning in sheep and calves. *Meat Sci* 1982;7:19–28.
  55. Cartner SC, Barlow SC, Ness TJ. Loss of cortical function in mice after decapitation, cervical dislocation, potassium chloride injection, and CO<sub>2</sub> inhalation. *Comp Med* 2007;57:570–573.
  56. Close B, Banister K, Baumans V, et al. Recommendations for euthanasia of experimental animals: part 2. DGXT of the European Commission. *Lab Anim* 1997;31:1–32.
  57. Close B, Banister K, Baumans V, et al. Recommendations for euthanasia of experimental animals: part 1. DGXI of the European Commission. *Lab Anim* 1996;30:293–316.
  58. Gregory NG, Wotton SB. Effect of slaughter on the spontaneous and evoked activity of the brain. *Br Poult Sci* 1986;27:195–205.
  59. Bates G. Humane issues surrounding decapitation reconsidered. *J Am Vet Med Assoc* 2010;237:1024–1026.
  60. Holson RR. Euthanasia by decapitation: evidence that this technique produces prompt, painless unconsciousness in laboratory rodents. *Neurotoxicol Teratol* 1992;14:253–257.
  61. Derr RF. Pain perception in decapitated rat brain. *Life Sci* 1991;49:1399–1402.
  62. Vanderwolf CH, Buzak DP, Cain RK, et al. Neocortical and hippocampal electrical activity following decapitation in the rat. *Brain Res* 1988;451:340–344.
  63. Mikeska JA, Klemm WR. EEG evaluation of humaneness of asphyxia and decapitation euthanasia of the laboratory rat. *Lab Anim Sci* 1975;25:175–179.
  64. Muir WW. Considerations for general anesthesia. In: Tranquilli WJ, Thurmon JC, Grimm KA, eds. *Lumb and Jones' veterinary anesthesia and analgesia*. 4th ed. Ames, Iowa: Blackwell, 2007;7–30.
  65. Erhardt W, Ring C, Kraft H, et al. CO<sub>2</sub> stunning of swine for slaughter from the anesthesiological viewpoint. *Dtsch Tierarztl Wochenschr* 1989;96:92–99.
  66. Terlouw C, Bourguet C, Deiss V. Consciousness, unconsciousness and death in the context of slaughter. Part 1. Neurobiological mechanisms underlying stunning and killing. *Meat Sci* 2016;118:133–146.
  67. Terlouw C, Bourguet C, Deiss V. Consciousness, unconsciousness and death in the context of slaughter. Part 2. Evaluation methods. *Meat Sci* 2016;118:147–156.
  68. Verhoeven MTW, Gerritzen MA, Kluijvers-Poodt M, et al. Validation of behavioural indicators used to assess unconsciousness in sheep. *Res Vet Sci* 2015;101:144–153.
  69. Verhoeven MT, Gerritzen MA, Hellebrekers LJ, et al. Indicators used in livestock to assess unconsciousness after stunning: a review. *Animal* 2015;9:320–330.
  70. Verhoeven MTW, Hellebrekers LJ, Gerritzen MA, et al. Validation of indicators used to assess unconsciousness in veal calves at slaughter. *Animal* 2016;10:1457–1465.
  71. Marchant N, Sanders R, Sleight J, et al. How electroencephalography serves the anesthesiologist. *Clin EEG Neurosci* 2014;45:22–32.
  72. International Association for the Study of Pain. Pain terms. Available at: [www.iasp-pain.org/AM/Template.cfm?Section=Pain\\_Definitions&Template=/CM/HTMLDisplay.cfm&ContentID=1728#](http://www.iasp-pain.org/AM/Template.cfm?Section=Pain_Definitions&Template=/CM/HTMLDisplay.cfm&ContentID=1728#) Pain. Accessed Feb 7, 2011.
  73. AVMA. AVMA guidelines on euthanasia. June 2007. Available at: [www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf). Accessed May 7, 2011.
  74. Tarsitano MS, Jackson RR. Araneophagic jumping spiders discriminate between detour routes that do and do not lead to prey. *Anim Behav* 1997;53:257–266.
  75. Jackson RR, Carter CM, Tarsitano MS. Trial-and-error solving of a confinement problem by a jumping spider, *Portia fimbriata*. *Behaviour* 2001;138:1215–1234.
  76. Dyakonova VE. Role of opioid peptides in behavior of invertebrates. *J Evol Biochem Physiol* 2001;37:335–347.
  77. Sladky KK, Kinney ME, Johnson SM. Analgesic efficacy of butorphanol and morphine in bearded dragons and corn snakes. *J Am Vet Med Assoc* 2008;233:267–273.
  78. Baker BB, Sladky KK, Johnson SM. Evaluation of the analgesic effects of oral and subcutaneous tramadol administration in red-eared slider turtles. *J Am Vet Med Assoc* 2011;238:220–227.
  79. Sneddon LU, Braithwaite VA, Gentle JM. Do fish have nociceptors? Evidence for the evolution of a vertebrate sensory system. *Proc Biol Sci* 2003;270:1115–1121.
  80. Sneddon LU. Anatomical and electrophysiological analysis of the trigeminal nerve in a teleost fish, *Oncorhynchus mykiss*. *Neurosci Lett* 2002;319:167–171.
  81. Rose JD. The neurobehavioral nature of fishes and the question of awareness and pain. *Rev Fish Sci* 2002;10:1–38.
  82. Nordgreen J, Horsberg TE, Ranheim B, et al. Somatosensory evoked potentials in the telencephalon of Atlantic salmon (*Salmo salar*) following galvanic stimulation of the tail. *J Comp Physiol A Neuroethol Sens Neural Behav Physiol* 2007;193:1235–1242.
  83. Dunlop R, Laming P. Mechanoreceptive and nociceptive responses in the central nervous system of goldfish (*Carassius auratus*) and trout (*Oncorhynchus mykiss*). *J Pain* 2005;6:561–568.
  84. Braithwaite VA. Cognition in fish. *Behav Physiol Fish* 2006;24:1–37.
  85. Kitchen N, Aronson AL, Bittle JL, et al. Panel report on the Colloquium on Recognition and Alleviation of Animal Pain and Distress. *J Am Vet Med Assoc* 1987;191:1186–1191.
  86. Wack R, Morris P, Sikarskie J, et al. Criteria for humane euthanasia and associated concerns. In: American Association of Zoo Veterinarians (AAZV). *Guidelines for euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;3–5.
  87. National Research Committee on Pain and Distress in Laboratory Animals, Institute of Laboratory Animal Resources, Commission on Life Sciences, National Research Council. *Recognition and alleviation of pain and distress in laboratory animals*. Washington, DC: National Academy Press, 1992.
  88. Breazile JE. Physiologic basis and consequences of distress in animals. *J Am Vet Med Assoc* 1987;191:1212–1215.
  89. McMillan FD. Comfort as the primary goal in veterinary medical practice. *J Am Vet Med Assoc* 1998;212:1370–1374.
  90. Fraser D. Assessing animal welfare at the farm and group level: the interplay of science and values. *Anim Welf* 2003;12:433–443.
  91. Coppola CL, Grandin T, Enns MR. Human interaction and cortisol: can human contact reduce stress in shelter dogs? *Physiol Behav* 2006;87:537–541.
  92. Van Reenen CG, O'Connell NE, Van der Werf JT, et al. Response of calves to acute stress: individual consistency and

- relations between behavioral and physiological measures. *Physiol Behav* 2005;85:557-570.
93. Dantzer R, Mormède P. Stress in farm animals: a need for reevaluation. *J Anim Sci* 1983;57:6-18.
  94. Moberg GP, Wood VA. Effect of differential rearing on the behavioral and adrenocortical response of lambs to a novel environment. *Appl Anim Ethol* 1982;8:269-279.
  95. Baran BE, Allen JA, Rogelberg SG, et al. Euthanasia-related strain and coping strategies in animal shelter employees. *J Am Vet Med Assoc* 2009;235:83-88.
  96. Collette JC, Millam JR, Klasing KC, et al. Neonatal handling of Amazon parrots alters stress response and immune function. *Appl Anim Behav Sci* 2000;66:335-349.
  97. Grandin T. Assessment of stress during handling and transport. *J Anim Sci* 1997;75:249-257.
  98. Boandl KE, Wohlt JE, Carsia RV. Effect of handling, administration of a local anesthetic and electrical dehorning on plasma cortisol in Holstein calves. *J Dairy Sci* 1989;72:2193.
  99. Lay DC, Friend TH, Bowers CL, et al. A comparative physiological and behavioral study of freeze and hot-iron branding using dairy cows. *J Anim Sci* 1992;70:1121-1125.
  100. Lay DC, Friend TH, Randel RD, et al. Behavioral and physiological effects of freeze and hot-iron branding on crossbred cattle. *J Anim Sci* 1992;70:330-336.
  101. Duke JL, Zammit TG, Lawson DM. The effects of routine cage-changing in cardiovascular and behavioral parameters in male Sprague-Dawley rats. *Contemp Top Lab Anim Sci* 2001;40:17-20.
  102. Ramsay EC, Wetzel RW. Comparison of five regimens for oral administration of medication to induce sedation in dogs prior to euthanasia. *J Am Vet Med Assoc* 1998;213:240-242.
  103. Wetzel RW, Ramsay EC. Comparison of four regimens for intraral administration of medication to induce sedation in cats prior to euthanasia. *J Am Vet Med Assoc* 1998;213:243-245.
  104. Houpt KA. *Domestic animal behavior for veterinarians and animal scientists*. 3rd ed. Ames, Iowa: Iowa State University Press, 1998.
  105. Beaver BV. *Canine behavior: a guide for veterinarians*. Philadelphia: WB Saunders Co, 1998.
  106. Beaver BV. *The veterinarian's encyclopedia of animal behavior*. Ames, Iowa: Iowa State University Press, 1994.
  107. Schafer M. *The language of the horse: habits and forms of expression*. New York: Arco Publishing Co, 1975.
  108. White RG, DeShazer JA, Tressler CJ, et al. Vocalization and physiological response of pigs during castration with and without a local anesthetic. *J Anim Sci* 1995;73:381-386.
  109. Warriss PD, Brown SN, Adams M. Relationships between subjective and objective assessments of stress at slaughter and meat quality in pigs. *Meat Sci* 1994;38:329-340.
  110. Dunn CS. Stress reactions of cattle undergoing ritual slaughter using two methods of restraint. *Vet Rec* 1990;126:522-525.
  111. Grandin T. Cattle vocalizations are associated with handling and equipment problems in slaughter plants. *Appl Anim Behav Sci* 2001;71:191-201.
  112. Grandin T. Objective scoring of animal handling and stunning practices at slaughter plants. *J Am Vet Med Assoc* 1998;212:36-39.
  113. Jones RB. Experimental novelty and tonic immobility in chickens (*Gallus domesticus*). *Behav Processes* 1984;9:255-260.
  114. Vieuille-Thomas C, Signoret JP. Pheromonal transmission of an aversive experience in domestic pig. *J Chem Ecol* 1992;18:1551-1557.
  115. Stevens DA, Saplikoski NJ. Rats' reactions to conspecific muscle and blood evidence for alarm substances. *Behav Biol* 1973;8:75-82.
  116. Grandin T. Effect of animal welfare audits of slaughter plants by a major fast food company on cattle handling and stunning practices. *J Am Vet Med Assoc* 2000;216:848-851.
  117. Grandin T. Euthanasia and slaughter of livestock. *J Am Vet Med Assoc* 1994;204:1354-1360.
  118. Grandin T. Pig behavior studies applied to slaughter-plant design. *Appl Anim Ethol* 1982;9:141-151.
  119. Grandin T. Observations of cattle behavior applied to design of cattle handling facilities. *Appl Anim Ethol* 1980;6:19-31.
  120. Knesl O, Hart B, Fine AH, et al. Veterinarians and humane endings: when is it the right time to euthanize a companion animal? *Front Vet Sci* 2017;4:45.
  121. Nogueira Borden LJ, Adams CL, Bonnett BN, et al. Use of the measure of patient-centered communication to analyze euthanasia discussions in companion animal practice. *J Am Vet Med Assoc* 2010;237:1275-1287.
  122. Martin F, Ruby KL, Deking TM, et al. Factors associated with client, staff, and student satisfaction regarding small animal euthanasia procedures at a veterinary teaching hospital. *J Am Vet Med Assoc* 2004;224:1774-1779.
  123. Guntzelman J, Riegger MH. Helping pet owners with the euthanasia decision. *Vet Med* 1993;88:26-34.
  124. Arluke A. Managing emotions in an animal shelter. In: Manning A, Serpell J, eds. *Animals and human society*. New York: Routledge, 1994;145-165.
  125. Rhoades RH. *The Humane Society of the United States euthanasia training manual*. Washington, DC: Humane Society Press, 2002.
  126. Manette CS. A reflection on the ways veterinarians cope with the death, euthanasia, and slaughter of animals. *J Am Vet Med Assoc* 2004;225:34-38.
  127. Adams CL, Bonnett BN, Meek AH. Predictors of owner response to companion animal death in 177 clients from 14 practices in Ontario. *J Am Vet Med Assoc* 2000;217:1303-1309.
  128. Shaw JR, Lagoni L. End-of-life communication in veterinary medicine: delivering bad news and euthanasia decision making. *Vet Clin North Am Small Anim Pract* 2007;37:95-108.
  129. Frid MH, Perea AT. Euthanasia and thanatology in small animals. *J Vet Behav* 2007;2:35-39.
  130. AVMA. Pet loss support hotlines (grief counseling). *J Am Vet Med Assoc* 1999;215:1805.
  131. Hart LA, Mader B. Pet loss support hotline: the veterinary students' perspective. *Calif Vet* 1992;(Jan-Feb):19-22.
  132. Neiburg HA, Fischer A. *Pet loss: a thoughtful guide for adults and children*. New York: Harper & Row, 1982.
  133. Rogelberg SG, Reeve CL, Spitzmüller C, et al. Impact of euthanasia rates, euthanasia practices, and human resource practices on employee turnover in animal shelters. *J Am Vet Med Assoc* 2007;230:713-719.
  134. Arluke A. Coping with euthanasia: a case study of shelter culture. *J Am Vet Med Assoc* 1991;198:1176-1180.
  135. Reeve CL, Rogelberg SG, Spitzmüller C, et al. The caring-killing paradox: euthanasia-related strain among animal shelter workers. *J Appl Soc Psychol* 2005;35:119-143.
  136. White DJ, Shawhan R. Emotional responses of animal shelter workers to euthanasia. *J Am Vet Med Assoc* 1996;208:846-849.
  137. Wolfe T. Laboratory animal technicians: their role in stress reduction and human-companion animal bonding. *Vet Clin North Am Small Anim Pract* 1985;15:449-454.
  138. Rohlf V, Bennett P. Perpetration-induced traumatic stress in persons who euthanize nonhuman animals in surgeries, animal shelters, and laboratories. *Soc Anim* 2005;13:201-219.
  139. Bayne K. Development of the human-research bond and its impact on animal well-being. *ILAR J* 2002;43:4-9.
  140. Chang FT, Hart LA. Human-animal bonds in the laboratory: how animal behavior affects the perspectives of caregivers. *ILAR J* 2002;43:10-18.
  141. Overhulse KA. Coping with lab animal morbidity and mortality: a trainer's role. *Lab Anim (NY)* 2002;31:39-42.
  142. Woods J, Shearer JK, Hill J. Recommended on-farm euthanasia practices. In: Grandin T, ed. *Improving animal welfare: a practical approach*. Wallingford, England: CABI Publishing, 2010.
  143. Morrow WEM. Euthanasia hazards. In: Langley RL, ed. *Animal handlers. Occupational medicine: state of the art reviews*. Philadelphia: Hanley and Belfus, 1999;235-246.

144. Radek L, Kallionpää RE, Karvonen M, et al. Dreaming and awareness during dexmedetomidine- and propofol- induced unresponsiveness. *Br J Anaesth* 2018;121:260–269.
145. Reilly JS, ed. *Euthanasia of animals used for scientific purposes*. Adelaide, SA, Australia: Australia and New Zealand Council for the Care of Animals in Research and Teaching, Department of Environmental Biology, Adelaide University, 2001.
146. Murray MJ. Euthanasia. In: Lewbart GA, ed. *Invertebrate medicine*. Ames, Iowa: Blackwell, 2006;303–304.
147. Messenger JB, Nixon M, Ryan KP. Magnesium chloride as an anaesthetic for cephalopods. *Comp Biochem Physiol C* 1985;82:203–205.
148. Meyer RE, Morrow WEM. Euthanasia. In: Rollin BE, Benson GJ, eds. *Improving the well-being of farm animals: maximizing welfare and minimizing pain and suffering*. Ames, Iowa: Blackwell, 2004;351–362.
149. Fakkema D. *Operational guide for animal care and control agencies: euthanasia by injection*. Denver: American Humane Association, 2010.
150. Krueger BW, Krueger KA. US Fish and Wildlife Service fact sheet: secondary pentobarbital poisoning in wildlife. Available at: [cpharm.vetmed.vt.edu/USFWS/](http://cpharm.vetmed.vt.edu/USFWS/). Accessed Mar 7, 2011.
151. O'Rourke K. Euthanatized animals can poison wildlife: veterinarians receive fines. *J Am Vet Med Assoc* 2002;220:146–147.
152. Otten DR. Advisory on proper disposal of euthanatized animals. *J Am Vet Med Assoc* 2001;219:1677–1678.

## Part II—Methods of Euthanasia

### MI Inhaled Agents

#### MI.1 COMMON CONSIDERATIONS

Inhaled vapors and gases require a critical concentration within the alveoli and blood for effect; thus, all inhaled methods have the potential to adversely affect animal welfare because onset of unconsciousness is not immediate. Distress may be created by properties of the agent (eg, pungency, hypoxia, hypercarbia) or by the conditions under which the agent is administered (eg, home cage or dedicated chamber, gradual displacement or refilling of the container), and may manifest itself behaviorally (eg, overt escape behaviors, approach-avoidance preferences [aversion]) or physiologically (eg, changes in heart rate, SNS activity, HPA activity). Although SNS and HPA activation are well accepted as markers of a stress response, these systems are activated in response to both physical and psychological stressors and are not necessarily associated with higher-order CNS processing and conscious experience by the animal. Furthermore, use of SNS and HPA activation to assess distress during inhalation of euthanasia agents is complicated by continued exposure to the agents during the period between loss of consciousness and death.

Distress during administration of inhaled agents has been evaluated by means of both behavioral assessment and aversion testing. While overt behavioral signs of distress have been reported in some studies, others have not consistently found these effects. Through preference and approach-avoidance testing, all inhaled agents currently used for euthanasia have been identified as being aversive to varying degrees. Aversion is a measure of preference, and while aversion does not necessarily imply that the experience is painful, forcing animals into aversive situations creates distress. The conditions of exposure used for aversion studies, however, may differ from those used for stunning or killing. In addition, agents identified as being less aversive (eg, Ar or N<sub>2</sub> gas mixtures, inhaled anesthetics) can still produce overt signs of behavioral distress (eg, open-mouth breathing) in some species under certain conditions of administration (eg, gradual displacement). As previously noted in the section on consciousness, one of the characteristics of anesthesia in people is feeling as if one is having an out-of-body experience, suggesting a disconnection between one's sense of self and one's awareness of time and space.<sup>1</sup> Although we cannot know for certain the subjective experiences of animals, one can speculate similar feelings of disorientation may contribute to the observed signs of distress.

As for physical methods, the conditions under which inhaled agents are administered for euthanasia can have profound effects on an animal's response

and, thus, agent suitability. Simply placing Sprague-Dawley rats into an unfamiliar exposure chamber containing room air produces arousal, if not distress.<sup>2</sup> Pigs are social animals and prefer not to be isolated from one another; consequently, moving them to the CO<sub>2</sub> stunning box in groups, rather than lining them up single file as needed for electric stunning, improves voluntary forward movement, reduces handling stress and electric prod use, and improves meat quality.<sup>3</sup>

That inhaled agents can produce distress and aversion in people raises concerns for their use in animals, in that the US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training<sup>4</sup> state, "Unless the contrary is established, investigators should consider that procedures that cause pain or distress in human beings may cause pain or distress in other animals." Interestingly, more than 40% of human children 2 to 10 years old display distress behaviors during sevoflurane induction, with 17% displaying significant distress and more than 30% physically resisting during induction.<sup>5</sup> Fear in children undergoing anesthesia may be due to odor, feel of the mask, or a true phobia of the mask.<sup>6</sup> Despite evidence of distress and aversion, inhaled anesthetics continue to be administered because the benefits associated with their use greatly outweigh any distress and/or aversion they may cause.

The suitability of any particular inhaled agent for euthanasia therefore depends largely on distress and/or pain experienced prior to loss of consciousness. Distress can be caused by handling, specific agent properties, or method of administration, such that a 1-size-fits-all approach cannot be easily applied. Suffering can be conceptualized as the product of severity, incidence, and duration. As a general rule, a gentle death that takes longer is preferable to a rapid, but more distressing death<sup>7</sup>; however, in some species and under some circumstances, the most humane and pragmatic option may be exposure to an aversive agent or condition that results in rapid unconsciousness with few or no outward signs of distress. Our goal is to identify best practices for administering inhaled agents, defining the optimal conditions for transport, handling, and agent selection and delivery to produce the least aversive and distressing experience for each species.

The following contingencies are common to all inhaled euthanasia agents:

- (1) Time to unconsciousness with inhaled agents is dependent on the displacement rate, container volume, and concentration. An understanding of the principles governing delivery of gases or vapors into enclosed spaces is necessary for appropriate application of both prefill and gradual displacement methods. The desired final concentration will be achieved more quickly by using a greater displacement rate (see MI.2).
- (2) Loss of consciousness will be more rapid if ani-

mals are initially exposed to a high concentration of the agent. However, for many agents and species, forced exposure to high concentrations can be aversive and distressing, such that gradual exposure may be the most pragmatic and humane option.

- (3) Inhaled agents must be supplied in purified form without contaminants or adulterants, typically from a commercially supplied source, cylinder, or tank, such that an effective displacement rate and/or concentration can be readily quantified. The direct application of products of combustion or sublimation is not acceptable due to unreliable or undesirable composition and/or displacement rate.
- (4) The equipment used to deliver and maintain inhaled agents must be in good working order and in compliance with state and federal regulations. Leaky or faulty equipment may lead to slow, distressful death and may be hazardous to other animals and to personnel.
- (5) Most inhaled agents are hazardous to animal workers because of the risk of explosions (eg, ether, CO), narcosis (eg, halocarbon anesthetics, nitrous oxide [N<sub>2</sub>O], CO<sub>2</sub>, asphyxiating gases), hypoxia (eg, asphyxiating gases, CO), addiction or physical abuse (eg, N<sub>2</sub>O, halocarbon anesthetics), or health effects resulting from chronic exposure (eg, N<sub>2</sub>O, CO, possibly halocarbon anesthetics).
- (6) In sick or depressed animals where ventilation is decreased, agitation during induction is more likely because the rise in alveolar gas concentration is delayed. A similar delayed rise in alveolar gas concentration can be observed in excited animals having increased cardiac output. Suitable premedication or noninhaled methods of euthanasia should be considered for such animals.
- (7) Neonatal animals appear to be resistant to hypoxia, and because all inhaled agents ultimately cause hypoxia, neonatal animals take longer to die than adults.<sup>8</sup> Inhaled agents can be used alone in unweaned animals to induce loss of consciousness, but prolonged exposure time or a secondary method may be required to kill the unconscious animal.
- (8) Reptiles, amphibians, and diving birds and mammals have a great capacity for holding their breath and for anaerobic metabolism. Therefore, induction of anesthesia and time to loss of consciousness when inhaled agents are used may be greatly prolonged. Noninhaled methods of euthanasia should be considered for these species and a secondary method is required to kill the unconscious animal.
- (9) Rapid gas flows can produce noise or cold drafts leading to animal fright and escape behaviors. If high flows are required, equipment should be designed to minimize noise and gas streams blowing directly on the animals.

- (10) When possible, inhaled agents should be administered under conditions where animals are most comfortable (eg, for rodents, in a darkened home cage<sup>9</sup>; for pigs, in small groups). If animals need to be combined, they should be of the same species and compatible cohorts, and, if needed, restrained or separated so that they will not hurt themselves or others. Chambers should not be overloaded and need to be kept clean to minimize odors that might cause distress in animals subsequently euthanized.
- (11) Because some inhaled agents may be lighter or heavier than air, layering or loss of agent may permit animals to avoid exposure. Mixing can be maximized by ensuring incoming gas or vapor flow rates are sufficient. Chambers and containers should be as leak free as possible.
- (12) Death must be verified following administration of inhaled agents. This can be done either by examination of individual animals or by adherence to validated exposure processes proven to result in death.<sup>10</sup> If an animal is not dead, exposure must be repeated or followed with another method of euthanasia.

## MI.2 PRINCIPLES GOVERNING ADMINISTRATION

Changes in gas concentration within any enclosed space involve 2 physical processes: 1) wash-in of new gas (or wash-out of existing gas) and 2) the time constant required for that change to occur within the container for a known flow rate. These processes are commonly combined in the practice of anesthesia to predict how quickly a change in concentration of an inhaled anesthetic will occur within a circle rebreathing circuit.<sup>11</sup> An understanding of how these processes work together is critical for the appropriate application of both gradual displacement and prefill immersion euthanasia methods.<sup>12</sup>

The rate of change of gas concentration within any enclosed space is a special form of nonlinear change known as an exponential process, and as such can be derived from the wash-in and wash-out exponential functions.<sup>13</sup> Briefly, for the wash-in exponential function the quantity under consideration rises toward a limiting value, at a rate that progressively decreases in proportion to the distance it still has to rise. In theory, the quantity approaches, but never reaches, 100%. Conversely, for the wash-out exponential function the quantity under consideration falls at a rate that progressively decreases in proportion to the distance it still has to fall. Again, in theory, the quantity approaches, but never reaches, zero.

The exponential wash-in and wash-out equations are used to derive the time constant ( $\tau$ ) for an enclosed volume or space. This constant is mathematically equal to the enclosed volume or space undergoing wash-in or wash-out divided by the rate of flow, or displacement, into that space, where  $\tau$  = volume/flow rate.<sup>13,14</sup> Thus, the time constant represents the

time at which the wash-in or wash-out process would have been complete had the initial rate of change continued as a linear function rather than an exponential function.<sup>13</sup> As such, the time constant is similar in concept to the half-life, although they are neither identical nor interchangeable.<sup>14</sup>

For the wash-in function,  $1(\tau)$  is required for the concentration of the inflowing gas to rise to 63.2% of the inflowing gas concentration,  $2(\tau)$  are required for the concentration to rise to 86.5%, and  $3(\tau)$  are required for the concentration to rise to 95%, with  $\infty(\tau)$  required for the gas concentration within the container to equal the inflowing gas concentration. Conversely, for the wash-out function,  $1(\tau)$  is required for the remaining gas concentration to fall to 36.8% of the original value,  $2(\tau)$  are required for gas concentration to fall to 13.5%,  $3(\tau)$  are required for gas concentration to fall to 5%, with  $\infty(\tau)$  required for gas concentration to fall to 0% (**Figure 3**). The flow, or displacement rate, therefore determines the time constant for any given enclosed volume, such that increasing the flow rate will result in a proportional reduction of the wash-in and wash-out time constants for any size chamber (and vice versa).

Based on Figure 3, it can be shown that a gradual inflow or displacement rate of 20% of the chamber volume/minute represents a time constant ( $\tau$ ) value of 5 minutes (1 divided by 0.2/min) regardless of chamber volume. For example, CO<sub>2</sub> displacement rate equivalent to 20% of the chamber volume/min, as recommended by Hornett and Haynes<sup>15</sup> and Smith and Harrap,<sup>16</sup> is predicted to increase CO<sub>2</sub> concentration from zero to 63.2% in 5 minutes ( $1\tau$ ), to 86.5% in 10 minutes ( $2\tau$ ), and to 95% in 15 minutes ( $3\tau$ ). An examination of the published experimental data of Smith and Harrap confirms this, where CO<sub>2</sub> supplied at a displacement rate of 22% of chamber volume increased the CO<sub>2</sub> concentration to approximately 64% in 4.5 minutes ( $1\tau$  for their chamber). Similarly, Niel and Weary<sup>17</sup> reported 65% after 340 seconds ( $1\tau$ ) and 87% after 600 seconds ( $2\tau$ ) for a CO<sub>2</sub> displacement rate of 17.5% of chamber volume/min. Prefill methods will require displacement rates of  $3\tau$  to attain 95% of the inflow gas concentration within the chamber.

Thus, gas displacement rate is critical to the humane application of inhaled methods, such that an appropriate pressure-reducing regulator and flow meter combination or equivalent equipment with demonstrated capability for generating the recommended displacement rate for the size container being utilized is absolutely necessary when compressed gases are used for euthanasia. Nitrogen, Ar, and CO are all commercially supplied in cylinders under high pressure, but CO<sub>2</sub> is unique in that it is supplied as a liquefied gas under high pressure. By reducing high pressure at the cylinder valve, gas flow is made constant to the flow meter as cylinder pressure decreases during use. With CO<sub>2</sub>, the regulator also acts to prevent high gas flow rates that can lead to delivery of freezing gas and

dry ice snow to the animals as well as regulator icing and cylinder freezing.

A distinction must be made between immersion, where animals are directly placed into a gas or vapor contained within a container, and the process of CAS as employed for the commercial stunning of poultry and hogs. Although a complete description of the operation of the commercial CAS systems currently in use is beyond the scope of this document, typically the entry point is open to the atmosphere with negligible concentrations of stunning gas present. Unlike immersion, animals are introduced at a controlled rate into a tightly controlled stunning atmospheric gradient, such that CAS can be considered to be a gradual displacement method.

### MI.3 INHALED ANESTHETICS

Overdoses of inhaled anesthetics (eg, ether, halothane, methoxyflurane, isoflurane, sevoflurane, desflurane, enflurane) have been used to euthanize many species.<sup>18</sup> Presently, only isoflurane, enflurane, sevoflurane, and desflurane are clinically available in the United States, although halothane and methoxyflurane are still available elsewhere in the world. Halothane induces anesthesia rapidly and is an effective inhaled agent for euthanasia. Enflurane is less soluble in blood than halothane, but, because of its lower vapor pressure and lower potency, induction rates may be similar to those for halothane. At deep anesthetic planes, convulsions may occur. Enflurane is an effective agent for euthanasia, but the associated seizure activity may be disturbing to personnel. Isoflurane is less soluble than halothane, and it induces anesthesia more rapidly. However, it has a pungent odor and onset of unconsciousness may be delayed due to breath holding. Due to lower potency, isoflurane also may require more drug to kill an animal, compared with halothane. Sevoflurane is less potent than either isoflurane or halothane and has a lower vapor pressure. Anesthetic concentrations can be achieved and maintained rapidly but more drug will be required to kill the animal. Although sevoflurane is reported to possess less of an objectionable odor than isoflurane, some species may struggle violently and experience apnea when sevoflurane is administered by face mask or induction chamber.<sup>19</sup> Like enflurane, sevoflurane induces epileptiform electrocortical activity.<sup>20</sup> Desflurane is currently the least soluble potent inhaled anesthetic, but the vapor is quite pungent, which may slow induction. This drug is so volatile that it could displace O<sub>2</sub> and induce hypoxemia during induction if supplemental O<sub>2</sub> is not provided. Both diethyl ether and methoxyflurane are highly soluble, and may be accompanied by agitation because anesthetic induction is quite slow. Diethyl ether is irritating to the eyes, nose, and respiratory airways; poses serious risks due to flammability and explosiveness; and has been used to create a model for stress.<sup>21-24</sup>

Although inhaled anesthetics are routinely used to produce general anesthesia in humans and animals,

these agents may be aversive and distressful under certain conditions. Flecknell et al<sup>19</sup> reported violent struggling accompanied by apnea and bradycardia in rabbits administered isoflurane, halothane, and sevoflurane by mask or induction chamber, and concluded these agents were aversive and should be avoided whenever possible. Leach et al<sup>25-27</sup> found inhaled anesthetic vapors to be associated with some degree of aversion in laboratory rodents, with increasing aversion noted as concentration increased; halothane was least aversive for rats, while halothane and enflurane were least aversive for mice. Makowska and Weary<sup>28</sup> also reported halothane and isoflurane to be aversive to male Wistar rats, but less so than CO<sub>2</sub>. Aversion to inhaled anesthetics increases following initial exposure; rodents are more likely to leave the test chamber on second and subsequent exposures to inhaled anesthetics.<sup>29-31</sup> This may indicate the possibility of learned aversion to these agents.<sup>32</sup>

Anesthetic vapor is inhaled until respiration ceases and death ensues. Because the liquid state of most inhaled anesthetics is irritating, animals should be exposed only to vapors. With inhaled anesthetics, animals can be placed in a closed receptacle containing cotton or gauze soaked with an appropriate amount of liquid anesthetic<sup>33</sup> or anesthetic vapor can be introduced from a precision vaporizer.<sup>34</sup> Precision anesthetic vaporizers typically are limited to 5% to 7% maximum output between 0.5 and 10 L/min O<sub>2</sub> flow rate. Induction time will be influenced by dial setting, flow rate, and size of the container; time to death may be prolonged because O<sub>2</sub> is commonly used as the vapor carrier gas. The amount of liquid anesthetic required to produce a given concentration of anesthetic vapor within any closed container can be readily calculated<sup>35</sup>; in the case of isoflurane, a maximum of 33% vapor can be produced at 20°C. Sufficient air or O<sub>2</sub> must be provided during the induction period to prevent hypoxia.<sup>33</sup> In the case of small rodents placed in a large container, there will be sufficient O<sub>2</sub> in the chamber to prevent hypoxia. Larger species placed in small containers may initially need supplemental air or O<sub>2</sub>.<sup>33</sup>

Nitrous oxide is the least potent of the inhalation anesthetics. In humans, the minimum alveolar concentration (defined as the median effective dose) for N<sub>2</sub>O is 104%; its potency in other species is less than half that in humans (ie, approx 200%). Because the effective dose for N<sub>2</sub>O is above 100%, it cannot be used alone at 1 atmosphere of pressure in any species without producing hypoxia prior to respiratory or cardiac arrest. As a result, animals may become distressed prior to loss of consciousness when N<sub>2</sub>O is used as the sole agent. Up to 70% N<sub>2</sub>O may be combined with other inhaled gases to speed the onset of anesthesia; however, the anesthetic contribution of N<sub>2</sub>O will be only half (20% to 30%) of that expected in humans due to its reduced potency in animals.<sup>36</sup>

The addition of N<sub>2</sub>O to inhaled gases may represent a refinement for euthanasia. Adding 75% N<sub>2</sub>O

to 5% isoflurane in oxygen reduced time to loss of righting in mice by approximately 18%, while at 20% displacement rate administration of a mixture of 60% N<sub>2</sub>O with CO<sub>2</sub> reduced time to loss of righting by 10%.<sup>37</sup> However, while N<sub>2</sub>O narcosis prior to CO<sub>2</sub> in 0- to 7-day-old piglets reduced the amount of time the piglets were exposed to CO<sub>2</sub>, it did not reduce the amount of distressful behaviors observed.<sup>38</sup>

Effective procedures should be in place to reduce animal worker exposure to anesthetic vapors.<sup>39</sup> Human workplace recommended exposure limits were issued in 1977 by the National Institute of Occupational Safety and Health; concentrations for halogenated inhaled anesthetics are not to exceed 2 ppm (1-hour ceiling) when used alone, or 0.5 ppm for halogenated anesthetics combined with 25-ppm N<sub>2</sub>O (time-weighted average during use). The American Conference of Government Industrial Hygienists has assigned a threshold limit value time-weighted average of 50 ppm for N<sub>2</sub>O, 50 ppm for halothane, and 75 ppm for enflurane for an 8-hour time-weighted exposure. These concentrations were established because they were found to be attainable utilizing clinical scavenging techniques and there are no controlled studies proving exposure at these concentrations are safe. No National Institute of Occupational Safety and Health-recommended exposure limits exist for the 3 most currently used anesthetics (isoflurane, desflurane, and sevoflurane), and, at present, the Occupational Safety and Health Administration has no permissible exposure limits regulating these specific agents.

*Advantages*—(1) Inhaled anesthetics are particularly useful for euthanasia of smaller animals (< 7 kg [15.4 lb]) or for animals in which venipuncture may be difficult. (2) Inhaled anesthetics can be administered by several different methods depending on the circumstances and equipment available (eg, face mask, open drop where the animal is not permitted to directly contact the anesthetic liquid, precision vaporizer, rigid or nonrigid containers). (3) Halothane, enflurane, isoflurane, sevoflurane, desflurane, methoxyflurane, and N<sub>2</sub>O are nonflammable and non-explosive under usual clinical conditions. (4) Inhaled anesthetics can be useful as the sole euthanasia agent or as part of a 2-step process, where animals are first rendered unconscious through exposure to inhaled anesthetic agents and subsequently killed via a secondary method.

*Disadvantages*—(1) Inhaled anesthetics are aversive to rabbits and laboratory rodents and the same may be true for other species. Animals may struggle and become anxious during induction of anesthesia, with some animals exhibiting escape behaviors prior to onset of unconsciousness. Learned aversion to inhaled anesthetics occurs in rodents. Should apnea or excitement occur, time to loss of consciousness may be prolonged. (2) Ether is irritating, flammable, and explosive. Explosions have occurred when animals, euthanized with ether, were placed in an ordinary

(not explosion-proof) refrigerator or freezer and when bagged animals were placed in an incinerator. (3) Induction with methoxyflurane is unacceptably slow in some species. (4) Because of design limits on vapor output, precision anesthetic vaporizers may be associated with a longer wash-in time constant and, thus, longer induction time; time to death may be prolonged as O<sub>2</sub> is commonly used as the vapor carrier gas. (5) Nitrous oxide used alone will create a hypoxic atmosphere and will support combustion at high concentrations. (6) Personnel and animals may be injured by exposure to these agents. There is recognized potential for human abuse of inhaled anesthetics. (7) Because large amounts of inhaled anesthetics are absorbed and substantial amounts remain in the body for days, even after apparent recovery,<sup>40</sup> use of inhaled anesthetics for euthanasia is unsuitable for food-producing animals due to potential for tissue residues.

*General recommendations*—Inhaled anesthetics are acceptable with conditions for euthanasia of small animals (< 7 kg) where the following contingencies can be met: (1) In those species where aversion or overt escape behaviors have not been noted, exposure to high concentrations resulting in rapid loss of consciousness is preferred. Otherwise, gradual-fill methods can be used, keeping in mind the effect that chamber volume, flow rate, and anesthetic concentration will have on the time constant and rate of rise of anesthetic concentration. Inhaled anesthetics can be administered as the sole euthanasia agent or as part of a 2-step process, where animals are first rendered unconscious through inhaled anesthetic agent exposure and then subsequently killed by a secondary method. (2) Order of preference is isoflurane, halothane, sevoflurane, enflurane, methoxyflurane, and desflurane, with or without N<sub>2</sub>O. Nitrous oxide should not be used alone. Methoxyflurane is acceptable with conditions only if other agents or methods are not available. Ether is not acceptable for euthanasia. (3) Although acceptable, inhaled anesthetics are generally not used for larger animals because of cost and difficulty of administration. (4) Exposure of workers to anesthetics must comply with state and federal occupational health and safety regulations. (5) Neonatal animals will require extended exposure times.<sup>41</sup>

## MI.4 CARBON MONOXIDE

Carbon monoxide is a colorless, odorless gas that is nonflammable and nonexplosive at concentrations < 12%. Carbon monoxide is a cumulative poison that produces fatal hypoxemia; it readily combines with hemoglobin and blocks uptake of O<sub>2</sub> by erythrocytes by forming carboxyhemoglobin.<sup>42,43</sup> Precisely because it is insidious, difficult to detect, and highly toxic even at low concentrations, the lethal properties of CO have long been recognized; indeed, approximately 50,000 emergency room visits for human CO poisoning occur in the United States annually.<sup>44</sup>

In people, the clinical presentation for CO inhalation is nonspecific, with headache, dizziness, and weakness the most common symptoms of low-level CO toxicosis. As concentrations of CO increase, these signs may be followed by decreased visual acuity, tinnitus, nausea, progressive depression, confusion, and collapse.<sup>45</sup> With higher-level exposure, coma, convulsions, and cardiorespiratory arrest may occur.<sup>43</sup> Carbon monoxide stimulates motor centers in the brain, such that loss of consciousness may be accompanied by convulsions and muscular spasms. Distinct signs of CO toxicosis are not evident until the CO concentration is 0.05% in air, and acute signs do not develop until CO concentration is approximately 0.2% in air. In humans, exposure to 0.32% CO and 0.45% CO for 1 hour will induce loss of consciousness and death, respectively.<sup>46</sup> Chronic exposure to low concentrations of CO may be a health hazard, especially with regard to cardiovascular disease and teratogenic effects.<sup>43,44,47-49</sup> An efficient exhaust or ventilation system is essential to prevent accidental exposure of humans.

In the past, mass euthanasia was accomplished by use of 3 different methods for generating CO: (1) chemical interaction of sodium formate and sulfuric acid, (2) exhaust fumes from gasoline internal combustion engines, and (3) commercially compressed CO in cylinders. The first 2 techniques are associated with substantial problems such as production of other gases, inadequate production of CO, inadequate gas cooling, inability to quantify delivery rate, and maintenance of equipment.

Ramsey and Eilmann<sup>50</sup> found that a concentration of 8% CO caused guinea pigs to collapse in 40 seconds to 2 minutes, and death occurred within 6 minutes. When used with mink and chinchillas, CO caused collapse in 1 minute, cessation of breathing in 2 minutes, and cardiac arrest in 5 to 7 minutes.<sup>51,52</sup> Chalifoux and Dallaire<sup>53</sup> evaluated the physiologic and behavioral characteristics of dogs exposed to 6% CO in air, and could not determine the precise time of loss of consciousness. Electroencephalographic recordings revealed 20 to 25 seconds of abnormal cortical function, and during this period the dogs became agitated and vocalized. It is not clear whether these behavioral responses are indicative of animal distress; however, humans in this phase reportedly are not distressed.<sup>42</sup> Subsequent studies<sup>54</sup> have revealed that tranquilization with acepromazine significantly decreases behavioral and physiologic responses of dogs euthanized with CO. Carbon monoxide is noted to be aversive to laboratory rats, but not as aversive as CO<sub>2</sub>.<sup>55</sup>

In 1 study on cats,<sup>56</sup> CO from gasoline engine exhaust was compared with a combination of 70% CO<sub>2</sub> plus 30% O<sub>2</sub>. Signs of agitation before loss of consciousness were greater for the CO<sub>2</sub>-plus-O<sub>2</sub> combination. Time to complete immobilization was greater with CO<sub>2</sub> plus O<sub>2</sub> (approx 90 seconds) than with CO alone (approx 56 seconds).<sup>56</sup> In another study in neo-



natal pigs,<sup>57</sup> excitation was less likely to precede loss of consciousness if animals were exposed to a slow rise in CO concentration.

A study of an epidemic of avian influenza in the Netherlands in 2003 compared the use of CO<sub>2</sub> with CO for gassing whole houses of poultry.<sup>58</sup> The researchers noted that more convulsions were observed in the presence of CO and recommended that CO<sub>2</sub> was the preferred agent for this application due to safety regulations required for the use of CO.

**Advantages**—(1) Carbon monoxide induces loss of consciousness without pain and with minimal discernible discomfort, depending on species. (2) Hypoxemia induced by CO is insidious. (3) Death occurs rapidly if concentrations of 4% to 6% are used.

**Disadvantages**—(1) Carbon monoxide is an aversive agent for laboratory rodents and the same may be true for other species. (2) Safeguards must be taken to prevent and monitor exposure of personnel. (3) Electrical equipment exposed to CO (eg, lights and fans) must be spark free and explosion proof.

**General recommendations**—Carbon monoxide is acceptable with conditions for euthanasia, provided all of the following contingencies are met: (1) Personnel using CO must be instructed thoroughly in its use and must understand its hazards and limitations. (2) The CO chamber must be of the highest-quality construction and should allow for separation of individual animals. If animals need to be combined, they should be of the same species, and, if needed, restrained or separated so that they will not hurt themselves or others. Chambers should not be overloaded and need to be kept clean to minimize odors that might distress animals that are subsequently euthanized. (3) The CO source and chamber must be located in a well-ventilated environment, preferably out-of-doors. (4) The chamber must be well lighted and must allow personnel direct observation of animals. (5) The CO flow rate should be adequate to rapidly achieve a uniform CO concentration of at least 6% after animals are placed in the chamber, except for those species (eg, neonatal pigs) where it has been shown that less agitation occurs with a gradual rise in CO concentration.<sup>57</sup> (6) If the chamber is inside a room, CO monitors must be placed in the room to warn personnel of hazardous concentrations. (7) It is essential that CO use be in compliance with state and federal occupational health and safety regulations. (8) Carbon monoxide must be supplied in a precisely regulated and purified form without contaminants or adulterants, typically from a commercially supplied cylinder or tank. The direct application of products of combustion or sublimation is not acceptable due to unreliable or undesirable composition and/or displacement rate. As gas displacement rate is critical to the humane application of CO, an appropriate pressure-reducing regulator and flow meter combination or equivalent equipment with demonstrated capability for generating the recommended displacement rate for the size container being utilized is absolutely necessary.

## MI.5 NITROGEN, ARGON

Nitrogen and Ar are odorless, colorless, and tasteless gases that are inert, nonflammable, and nonexplosive. Nitrogen normally comprises 78% of atmospheric air, whereas Ar comprises < 1%. These gases function in the current context by displacing air (and the O<sub>2</sub> it contains), causing anoxia. Exposure of Sprague-Dawley rats to severe hypoxic conditions (< 2% O<sub>2</sub>) using either gas leads to unconsciousness around 90 seconds and death after 3 minutes using Ar or 7 minutes using N<sub>2</sub><sup>2</sup>; similar findings have been reported for dogs, rabbits, and mink.<sup>51,52,59,60</sup> Male Sprague-Dawley rats become hyperpneic, but can survive for more than 20 minutes in Ar or N<sub>2</sub> at an O<sub>2</sub> concentration of 4.9%.<sup>61</sup>

Rats are sensitive to even small changes in the concentration of O<sub>2</sub>, and are able to detect concentrations both lower and higher than the 20.9% normally found in air.<sup>62</sup> Rats and mice allowed to travel between chambers containing different gases spent most of their time in the control chamber (containing air), but preferred a hypoxic chamber (containing Ar) to a chamber containing CO<sub>2</sub>; however, the animals stayed only a few seconds in either gas.<sup>25-27</sup> Even when rats were trained to enter a chamber for a food reward they typically refused to enter, or left immediately after entering, when the atmosphere was hypoxic (< 2% O<sub>2</sub>, 90% Ar).<sup>63</sup> When rats were exposed to gradually decreasing concentrations of O<sub>2</sub> and increasing concentrations of Ar, they always left the chamber before losing consciousness (typically when O<sub>2</sub> declined to about 7%).<sup>64</sup> With N<sub>2</sub> flowing at a rate of 39% of chamber volume/min ( $\tau = 2$  minutes 34 seconds), rats collapsed in approximately 3 minutes and stopped breathing in 5 to 6 minutes; regardless of flow rate, signs of panic and distress were evident before the rats collapsed and died.<sup>15</sup> During forced exposure to Ar gradually filling a chamber at a rate of 50% of the chamber volume/min ( $\tau = 2$  minutes), male Sprague-Dawley rats showed open-mouthed breathing and seizure-like behavior prior to loss of consciousness, suggesting similar potential for distress.<sup>65</sup> These observations are not surprising, as gradual displacement methods using N<sub>2</sub> or Ar, alone or mixed with other gases, are predicted by the wash-in and wash-out functions to result in prolonged exposure to hypoxic conditions.

In contrast, hypoxia produced by inert gases such as N<sub>2</sub> and Ar appears to cause little or no aversion in turkeys<sup>66</sup> or chickens<sup>67</sup>; these animals freely entered a chamber containing < 2% O<sub>2</sub> and > 90% Ar. When Ar was used to euthanize chickens, exposure to a chamber prefilled with Ar, with an O<sub>2</sub> concentration of < 2%, led to EEG changes and collapse in 9 to 12 seconds. Birds removed from the chamber at 15 to 17 seconds failed to respond to comb pinching. Continued exposure led to convulsions at 20 to 24 seconds. Somatosensory evoked potentials were lost at 24 to 34 seconds, and the EEG became isoelectric at 57 to 66 seconds.<sup>68</sup> With turkeys, immersion in 90% Ar

with 2% residual O<sub>2</sub> led to EEG suppression in 41 seconds, loss of Somatosensory evoked potential in 44 seconds, and isoelectric EEG in 101 seconds, leading the authors to conclude exposure times > 3 minutes were necessary to kill all birds.<sup>69</sup> Failure to maintain < 2% O<sub>2</sub> prolongs survival.<sup>70,71</sup> Gerritzen et al<sup>72</sup> also reported that chickens did not avoid chambers containing < 2% O<sub>2</sub>; birds gradually became unconscious without showing signs of distress. Chickens<sup>72-75</sup> and turkeys<sup>66</sup> killed by hypoxia show less head shaking and open-beak breathing than birds exposed to CO<sub>2</sub>.

Hypoxia produced by N<sub>2</sub> and Ar appears to reduce, but not eliminate, aversive responses in pigs. Pigs chose to place their head in a hypoxic (< 2% O<sub>2</sub>, 90% Ar) chamber containing a food reward, remained with their head in the chamber until they became ataxic, and freely returned to the chamber once they regained posture.<sup>76</sup> In contrast, exposure to 90% Ar, 70% N<sub>2</sub>/30% CO<sub>2</sub>, and 85% N<sub>2</sub>/15% CO<sub>2</sub> all resulted in signs of aversion, defined by the authors as escape attempts and gasping; however, the proportion of pigs showing these behaviors was lowest with Ar.<sup>77</sup> Early removal from the stunning atmosphere results in rapid regaining of consciousness, such that exposure times > 7 minutes are needed to ensure killing with these gases.<sup>78</sup>

Mink will also enter into a hypoxic chamber (< 2% O<sub>2</sub>, 90% Ar), but will not remain until the point of unconsciousness. The duration of hypoxic exposure freely chosen is similar to the average duration of a dive for mink, suggesting they are able to detect hypoxia and modify their behavior to avoid detrimental effects.<sup>79</sup>

**Advantages**—(1) Nitrogen and Ar do not appear to be directly aversive to chickens or turkeys, and the resulting hypoxia appears to be nonaversive or only mildly aversive to these species. Similarly, N<sub>2</sub> and Ar gas mixtures do not appear to be directly aversive to pigs and appear to reduce, but not eliminate, the behavioral responses to hypoxia. (2) Nitrogen and Ar are nonflammable, nonexplosive, and readily available as compressed gases. (3) Hazards to personnel are minimal when used with properly designed equipment. (4) Argon and N<sub>2</sub>-CO<sub>2</sub> gas mixtures are heavier than air and can be contained within an apparatus into which animals and birds can be lowered or immersed.<sup>77</sup>

**Disadvantages**—(1) Hypoxia resulting from exposure to these gases is aversive to rats, mice, and mink. (2) Based on the wash-in and wash-out functions, gradual displacement methods using N<sub>2</sub> or Ar, alone or mixed with other gases, may result in exposure to hypoxic conditions prior to loss of consciousness. Loss of consciousness will be preceded by open-mouth breathing and hyperpnea, which may be distressing for nonavian species. (3) Reestablishing a low concentration of O<sub>2</sub> (ie, 6% or greater) in the chamber before death will allow immediate recovery.<sup>76,78,80</sup> (4) Exposure times > 7 minutes are needed to ensure killing of pigs. (5) As with CO<sub>2</sub>, rats eutha-

nized with Ar demonstrate alveolar hemorrhage consistent with terminal asphyxiation.<sup>65</sup> (6) Argon costs about 3 times as much as N<sub>2</sub>. (7) These gases tend to cause more convulsive wing flapping in poultry than CO<sub>2</sub> in air mixtures.

**General recommendations**—Hypoxia resulting from exposure to Ar or N<sub>2</sub> gas mixtures is acceptable with conditions for euthanasia of chickens and turkeys. Likewise, hypoxia resulting from Ar or N<sub>2</sub>-CO<sub>2</sub> gas mixtures is acceptable with conditions for euthanasia of pigs, provided animals can be directly placed into a < 2% O<sub>2</sub> atmosphere and exposure times > 7 minutes are used. Use of Ar or N<sub>2</sub> is unacceptable for other mammals. These gases create an anoxic environment that is distressing for some species and aversive to laboratory rodents and mink; other methods of euthanasia are preferable for these species. Argon or N<sub>2</sub> hypoxia, defined as O<sub>2</sub> < 2%, could be used to kill these animals after they are rendered unconscious via an acceptable method, although prolonged exposure may be necessary to ensure death.

Nitrogen, Ar, and gas mixtures containing these gases must be supplied in a precisely regulated and purified form without contaminants or adulterants, typically from a commercially supplied cylinder or tank. The direct application of products of combustion or sublimation is not acceptable due to unreliable or undesirable composition or displacement rate. As gas displacement rate is critical to the humane application of these gases, an appropriate pressure-reducing regulator and flow meter combination or equivalent equipment with demonstrated capability for generating the recommended displacement rate for the size container being utilized is absolutely necessary.

## MI.6 CARBON DIOXIDE

Inhalation of CO<sub>2</sub> causes respiratory acidosis and produces a reversible anesthetic state by rapidly decreasing intracellular pH.<sup>81</sup> Both basal and evoked neural activity are depressed soon after inhalation of 100% CO<sub>2</sub>.<sup>81-84</sup> Inhalation of CO<sub>2</sub> at a concentration of 7.5% increases pain threshold, and concentrations of 30% and higher cause deep anesthesia and death with prolonged exposure.<sup>16,17,85-87</sup> Methods to administer CO<sub>2</sub> include placing animals directly into a closed, prefilled chamber containing CO<sub>2</sub>, or exposure to a gradually increasing concentration of CO<sub>2</sub>.

Carbon dioxide has the potential to cause distress in animals via 3 different mechanisms: (1) pain due to formation of carbonic acid on respiratory and ocular membranes, (2) production of so-called air hunger and a feeling of breathlessness, and (3) direct stimulation of ion channels within the amygdala associated with the fear response. Substantial species and strain differences are reported.

Carbon dioxide may cause pain due to the formation of carbonic acid when it contacts moisture on the respiratory and ocular membranes. In humans, rats, and cats, most nociceptors begin to respond at

CO<sub>2</sub> concentrations of approximately 40%.<sup>88-91</sup> Humans report discomfort begins at 30% to 50% CO<sub>2</sub> and intensifies to overt pain with higher concentrations.<sup>92-94</sup> Inhaled irritants are known to induce a reflex apnea and heart rate reduction, and these responses are thought to reduce transfer of harmful substances into the body.<sup>95</sup> In rats, 100% CO<sub>2</sub> elicits apnea and bradycardia, but CO<sub>2</sub> at concentrations of 10%, 25%, and 50% does not,<sup>96</sup> suggesting that gradual displacement methods are less likely to produce pain prior to unconsciousness in rodents where unconsciousness occurs before chamber concentration reaches levels associated with nociceptor activation.<sup>32</sup> On the other hand, bradycardia associated with CO<sub>2</sub> exposure in rats is reported to occur prior to loss of consciousness.<sup>97</sup>

Carbon dioxide has a key role as a respiratory stimulant, and elevated concentrations are known to cause profound effects on the respiratory system, cardiovascular system, and SNS.<sup>98-100</sup> In humans, air hunger begins at concentrations as low as 8% and this sensation intensifies with higher concentrations, becoming severe at approximately 15%.<sup>101-103</sup> With mild increases in inspired CO<sub>2</sub>, increased ventilation results in a reduction or elimination of air hunger, but there are limits to this compensatory mechanism such that air hunger may reoccur during spontaneous breathing with moderate hypercarbia and hypoxemia.<sup>104-106</sup> Adding O<sub>2</sub> to CO<sub>2</sub> may or may not preclude signs of distress.<sup>94,107-109</sup> Supplemental O<sub>2</sub> will, however, prolong time to hypoxemic death and may delay onset of unconsciousness.

Although CO<sub>2</sub> exposure has the potential to produce a stress response, interpretation of the subjective experiences of animals is complicated. Borovsky<sup>110</sup> found an increase in norepinephrine in rats following 30 seconds of exposure to 100% CO<sub>2</sub>. Similarly, Reed<sup>111</sup> exposed rats to 20 to 25 seconds of CO<sub>2</sub>, which was sufficient to render them recumbent, unconscious, and unresponsive, and observed 10-fold increases in vasopressin and oxytocin concentrations. Indirect measures of SNS activation, such as elevated heart rate and blood pressure, have been complicated by the rapid depressant effects of CO<sub>2</sub> exposure. Activation of the HPA has also been examined during CO<sub>2</sub> exposure. Prolonged exposure to low concentrations of CO<sub>2</sub> (6% to 10%) has been found to increase corticosterone in rats<sup>112,113</sup> and cortisol in dogs.<sup>114</sup> In a single-blind study in healthy human volunteers, a single breath of 35% CO<sub>2</sub> was found to result in elevated cortisol concentrations and exposure was associated with an increase in fear.<sup>115</sup> It has been suggested that responses to systemic stressors associated with immediate survival, such as hypoxia and hypercapnia, are likely directly relayed from brainstem nuclei and are not associated with higher-order CNS processing and conscious experience.<sup>116</sup> In fact, Kc et al<sup>117</sup> found that hypothalamic vasopressin-containing neurons are similarly activated in response to CO<sub>2</sub> exposure in both awake and anesthetized rats. As stated previ-

ously, assessment of the animal's response to inhaled agents, such as CO<sub>2</sub>, is complicated by continued exposure during the period between loss of consciousness and death.

Distress during CO<sub>2</sub> exposure has also been examined by means of behavioral assessment and aversion testing. Variability in behavioral responses to CO<sub>2</sub> has been reported for rats and mice,<sup>15-17,65,108,118-120</sup> pigs,<sup>76,121-124</sup> and poultry.<sup>66,72-75,125-128</sup> While signs of distress have been reported as occurring in animals in some studies, other researchers have not consistently observed these effects. This may be due to variations in methods of gas exposure and types of behaviors assessed, as well as strain variability.

Using preference and approach-avoidance testing, rats and mice show aversion to CO<sub>2</sub> concentrations sufficient to induce unconsciousness,<sup>25,26</sup> and are willing to forgo a palatable food reward to avoid exposure to CO<sub>2</sub> concentrations of approximately 15% and higher<sup>28,63</sup> after up to 24 hours of food deprivation.<sup>107</sup> Powell et al<sup>9</sup> reported a significant increase in anxious behaviors in mice with exposure to isoflurane, high-flow CO<sub>2</sub>, and brightly lighted chambers. Mink will avoid a chamber containing a desirable novel object when it contains 100% CO<sub>2</sub>.<sup>129</sup> In contrast to other species, a large proportion of chickens and turkeys will enter a chamber containing moderate concentrations of CO<sub>2</sub> (60%) to gain access to food or social contact.<sup>67,72,121</sup> Following incapacitation and prior to loss of consciousness, birds in these studies show behaviors such as open-beak breathing and head-shaking; these behaviors, however, may not be associated with distress because birds do not withdraw from CO<sub>2</sub> when these behaviors occur.<sup>73</sup> Thus, it appears that birds are more willing than rodents and mink to tolerate CO<sub>2</sub> at concentrations that are sufficient to induce loss of posture, and that loss of consciousness follows shortly afterwards. Using an approach-avoidance model, a preliminary study by Withrock et al<sup>130</sup> suggests that dairy goat kids exhibit no avoidance behaviors to 10% to 30% CO<sub>2</sub> and do not develop conditioned aversion.

Genetics may play a role in CO<sub>2</sub> response variability. Panic disorder in humans is genetically linked to enhanced sensitivity to CO<sub>2</sub>.<sup>131</sup> The fear network, comprising the hippocampus, the medial prefrontal cortex, the amygdala, and its brainstem projections, appears to be abnormally sensitive to CO<sub>2</sub> in these patients.<sup>132</sup> The genetic background of some pigs, especially excitable lines such as the Hampshire and German Landrace, has been associated with animals that react poorly to CO<sub>2</sub> stunning, while calmer lines combining the Yorkshire or Dutch Landrace conformations show much milder reactions.<sup>133</sup> Given a choice, Duroc and Large White pigs will tolerate 30% CO<sub>2</sub> to gain access to a food reward, but will forgo the reward to avoid exposure to 90% CO<sub>2</sub>, even after a 24-hour period of food deprivation.<sup>76,121</sup> A shock with an electric prod, however, is more aversive to Landrace X Large White pigs than inhaling 60% or 90%

CO<sub>2</sub>, with pigs inhaling 60% CO<sub>2</sub> willing to reenter the crate containing CO<sub>2</sub>.<sup>122</sup> Until further research is conducted, one can conclude that use of CO<sub>2</sub> may be humane for certain genetic lines of pigs and stressful for others.<sup>133</sup>

Recent studies involving mice have found regions of the amygdala associated with fear behavior to contain ASICs sensitive to elevated CO<sub>2</sub>.<sup>134</sup> Fear behaviors and aversion in response to CO<sub>2</sub> exposure were reduced in mice in which the ASIC receptors were eliminated or inhibited, suggesting that aversive responses to CO<sub>2</sub> in rodents, and potentially other species, are mediated in part by an innate fear response. Further studies defining the presence of ASICs and their role in CO<sub>2</sub>-induced fear in other rodent strains, as well as other animal species, are warranted.

As with other inhaled agents, time to unconsciousness with CO<sub>2</sub> is dependent on the displacement rate, container volume, and concentration used. In rats, unconsciousness is induced in approximately 12 to 33 seconds with 80% to 100% CO<sub>2</sub> and 40 to 50 seconds with 70% CO<sub>2</sub>.<sup>108,135</sup> Similarly, a rapidly increasing concentration (flow rate > 50% of the chamber volume/minute) induces unconsciousness in only 26 to 48 seconds.<sup>16,17,29,65,109,118,136</sup> Leake and Waters<sup>87</sup> found that dogs exposed to 30% to 40% CO<sub>2</sub> were anesthetized in 1 to 2 minutes. For cats, inhalation of 60% CO<sub>2</sub> results in loss of consciousness within 45 seconds, and respiratory arrest within 5 minutes.<sup>137</sup> For pigs, exposure to 60% to 90% CO<sub>2</sub> causes unconsciousness in 14 to 30 seconds,<sup>80-82,121</sup> with unconsciousness occurring prior to onset of signs of excitation.<sup>80,84</sup> Euthanasia via exposure to CO<sub>2</sub> has been described for individual birds and small groups,<sup>138</sup> and its application to euthanasia of chickens, turkeys, ducks, and rabbits has been studied, resulting in information about times to collapse, unconsciousness and death, loss of somatosensory evoked potentials, and changes in EEG. Leghorn chicks 7 days of age collapsed in 12 seconds after exposure to 97% CO<sub>2</sub>.<sup>119</sup> Raj<sup>71</sup> found that 2 minutes' exposure to 90% CO<sub>2</sub> was sufficient to kill day-old chicks exposed in batches. Broilers 5 weeks of age collapsed an average of 17 seconds after entering a tunnel filled with 60% CO<sub>2</sub>.<sup>72</sup>

Unlike N<sub>2</sub> and Ar, which must be held within a very tight range of concentration for effective euthanasia, CO<sub>2</sub> can render poultry unconscious and kill over a wide range of concentrations. In tests where it took 8 seconds to achieve the target gas concentration, broilers and mature hens collapsed in 19 to 21 seconds at 65% CO<sub>2</sub> and 25 to 28 seconds at 35% CO<sub>2</sub>.<sup>139</sup> In a gradual-fill study, ducks and turkeys lost consciousness before 25% CO<sub>2</sub> was reached and died after the concentration reached 45%.<sup>125</sup> At 49% CO<sub>2</sub>, EEG suppression, loss of somatosensory evoked potentials, and EEG silence occurred in 11, 26, and 76 seconds in chickens.<sup>140</sup> In turkeys, EEG suppression took place in an average of 21 seconds at 49% CO<sub>2</sub>, but was reduced to 13 seconds at 86% CO<sub>2</sub>. In the same report, time to loss of somatosensory evoked

potentials was not affected by gas concentration, averaging 20, 15, and 21 seconds, but time to EEG silence was concentration dependent (ie, 88, 67, and 42 seconds for 49%, 65%, and 86% CO<sub>2</sub>, respectively).<sup>141</sup>

In rabbits, a 58% CO<sub>2</sub> displacement rate resulted in a significantly shorter time to insensibility and death than did a 28% displacement rate, with neither rate reported as inducing significant distress behaviors.<sup>142</sup> In contrast, Dalmau et al<sup>143</sup> compared immersion of meat rabbits into a commercial stunning system prefilled with 70%, 80%, or 90% CO<sub>2</sub>. Loss of posture occurred within the first 30 seconds following initial exposure to CO<sub>2</sub>; however, aversion (as nasal discomfort and vocalizations) was observed for 15 seconds prior to loss of posture. Dalmau et al concluded that despite the advantages their system provides in terms of prestunning handling and irreversibility, it is not free of animal welfare problems.

As a general rule, a gentle death that takes longer is preferable to a rapid, but more distressing death.<sup>7</sup> Gradual-fill CO<sub>2</sub> exposure causes aversion in rodents beginning at approximately a 15% concentration and lasting to onset of unconsciousness. If an appropriate gradual displacement rate is used, animals will lose consciousness before CO<sub>2</sub> concentrations become painful.<sup>32,65</sup> A 20%/min gradual displacement produces unconsciousness in 106 seconds at a CO<sub>2</sub> concentration of 30%<sup>15,17,94,109</sup>; a slower 10%/min displacement increases time to onset of unconsciousness to 156 seconds at a CO<sub>2</sub> concentration of 21%.<sup>65</sup> A 50%/min CO<sub>2</sub> displacement rate, while holding the chamber concentration just below 40% CO<sub>2</sub>, minimizes the interval between onset of labored breathing and recumbency in mice; however, even at these rates, mice experienced > 30 seconds between onset of dyspnea and insensibility.<sup>29</sup> For poultry, immersion into relatively low concentrations or exposure to CO<sub>2</sub> concentrations producing a gradual induction of unconsciousness reduces convulsions compared with immersion into N<sub>2</sub> or Ar.<sup>74,144</sup> Carbon dioxide may invoke involuntary (unconscious) motor activity in birds, such as flapping of the wings or other terminal movements, which can damage tissues and be disconcerting for observers<sup>119,145</sup>; wing flapping is less with CO<sub>2</sub> than with N<sub>2</sub> or Ar.<sup>144</sup>

Due to respiratory adaptations in immature animals, reptiles, amphibians, and some burrowing and diving species (eg, lagomorphs, mustelids, aquatic birds, nonhatched birds, newly hatched chicks), high CO<sub>2</sub> concentrations, combined with extended exposure times, follow-up exposure to hypoxemia, or a secondary euthanasia method, may be required to ensure unconsciousness and death. High CO<sub>2</sub> concentrations (> 60%) and extended exposure times (> 5 minutes) are required for effective euthanasia of newly hatched chickens.<sup>71,146</sup> On the day of birth, rats and mice exposed to 100% CO<sub>2</sub> required exposure times of 35 and 50 minutes, respectively, to ensure death. By 10 days of age, exposure times of 5 minutes were sufficient to ensure death.<sup>147,148</sup> For adult mink,

5 minutes of exposure is sufficient to ensure death using 100% CO<sub>2</sub>, but not using 70% CO<sub>2</sub>.<sup>51</sup> Rabbits of the genus *Oryctolagus* also have prolonged survival times when exposed to CO<sub>2</sub>.<sup>149</sup>

Inhaled halocarbon anesthetics have been proposed as alternatives to CO<sub>2</sub> for rodent euthanasia.<sup>7,28,34</sup> Inhaled anesthetics also produce various degrees of aversion in rodents<sup>25-28</sup> and are associated in other animals and humans with aversion, distress, and escape behaviors during anesthetic induction. Both mice and rats will always choose exposure to light (an aversive condition) over exposure to CO<sub>2</sub> (more aversive) in approach-avoidance tests, while > 50% of mice and rats will tolerate first exposure to an inhalant anesthetic until they become recumbent. However, mice and rats also show evidence of learned aversion to inhaled anesthetic agents and are more likely to escape the test chamber, and to do so more quickly, on second and subsequent exposures to inhaled anesthetics; in contrast, aversion to CO<sub>2</sub> does not increase with subsequent exposures.<sup>32</sup> Time to death may be prolonged as O<sub>2</sub> is commonly used as the vapor carrier gas with precision anesthetic vaporizers. Because large amounts of inhaled anesthetics are absorbed and substantial amounts remain in the body for days, even after apparent recovery,<sup>40</sup> euthanasia via inhaled anesthetics is unsuitable for food-producing animals because of the potential for tissue residues. Effective procedures should be in place to reduce worker exposure to anesthetic vapors. While incorporating inhaled anesthetics can be considered a potential refinement to CO<sub>2</sub> and anoxic methods, further consideration of the consequences associated with this strategy is warranted.

**Advantages**—(1) The rapid depressant, analgesic, and anesthetic effects of CO<sub>2</sub> are well established. (2) Carbon dioxide is readily available in compressed gas cylinders. (3) Carbon dioxide is inexpensive, nonflammable, and nonexplosive and poses minimal hazard to personnel when used with properly designed equipment. (4) Carbon dioxide does not result in accumulation of toxic tissue residues in animals from which food is produced.

**Disadvantages**—(1) Substantial and conflicting differences in response to CO<sub>2</sub> inhalation exist between and within species, strains, and breeds, making broad generalizations difficult. (2) Carbon dioxide, whether administered by prefill or gradual displacement methods, can be aversive to some species, and therefore potential exists to cause distress. (3) Because CO<sub>2</sub> is heavier than air, layering of gas or incomplete filling of a chamber may permit animals to climb or raise their heads above the effective concentrations and avoid exposure. (4) Immature individuals and some aquatic and burrowing species may have extraordinary tolerance for CO<sub>2</sub>. (5) Reptiles and amphibians may breathe too slowly for the use of CO<sub>2</sub>. (6) Euthanasia by exposure to CO<sub>2</sub> with O<sub>2</sub> supplementation may take longer than euthanasia by other means.<sup>94,108,109</sup> (7) Induction of loss of

consciousness at concentrations < 80% may produce postmortem pulmonary and upper respiratory tract lesions.<sup>94,150</sup> (8) Dry ice and liquid CO<sub>2</sub> are potential sources of distress or injury if permitted to directly contact animals. (9) If animals are anesthetized with inhaled agents prior to completing the euthanasia process with CO<sub>2</sub>, sufficient time should be allowed to prevent rapid recovery during the wash-in of CO<sub>2</sub> and the subsequent wash-out of inhaled agent.<sup>32,151</sup>

**General recommendations**—Carbon dioxide is acceptable with conditions for euthanasia in those species where aversion or distress can be minimized. Carbon dioxide exposure using a gradual-fill method is less likely to cause pain due to nociceptor activation by carbonic acid prior to onset of unconsciousness; a displacement rate from 30% to 70% of the chamber volume/min is recommended for rodents.<sup>15,63,65,142</sup> Consideration should be given to the benefits of using a darkened home cage, while also keeping in mind the need to have the animal under observation.<sup>9</sup> Whenever gradual displacement methods are used, CO<sub>2</sub> flow should be maintained for at least 1 minute after respiratory arrest.<sup>16</sup> If animals need to be combined, they should be of the same species and, if needed, restrained so that they will not hurt themselves or others. Immature animals must be exposed to high concentrations of CO<sub>2</sub> for an extended period of time to ensure death. Oxygen administered together with CO<sub>2</sub> appears to provide little advantage and is not recommended for euthanasia. There is no apparent welfare advantage to killing animals with CO<sub>2</sub> when prior exposure to inhaled anesthetics has occurred.<sup>32</sup>

The practice of immersion, where conscious rodents are placed directly into a container prefilled with 100% CO<sub>2</sub>, is unacceptable. A 2-step process, where animals are first rendered unconscious and then immersed into 100% CO<sub>2</sub>, is preferred when gradual displacement methods cannot be used. Further studies are necessary before CO<sub>2</sub> immersion can be recommended for rabbits.<sup>143</sup> Immersion of poultry in lesser concentrations is acceptable with conditions as it does not appear to be distressing.

Carbon dioxide and CO<sub>2</sub> gas mixtures must be supplied in a precisely regulated and purified form without contaminants or adulterants, typically from a commercially supplied cylinder or tank. The direct application of products of combustion or sublimation is not acceptable due to unreliable or undesirable composition and/or displacement rate. As gas displacement rate is critical to the humane application of CO<sub>2</sub>, an appropriate pressure-reducing regulator and flow meter or equivalent equipment with demonstrated capability for generating the recommended displacement rates for the size container being utilized is absolutely necessary.

## **M2 Noninhaled Agents**

### **M2.1 COMMON CONSIDERATIONS**

Noninhaled agents of euthanasia include chemical agents that are introduced into the body by means other than through direct delivery to the respiratory tract. The primary routes of their administration are parenteral injection, topical application, and immersion. When it is being determined whether a particular drug and route of administration are appropriate for euthanasia, consideration needs to be given to the species involved, the pharmacodynamics of the chemical agent, degree of physical or chemical restraint required, potential hazards to personnel, consequences of intended or unintended consumption of the animal's remains by humans and other animals, and potential hazards to the environment from chemical residues. Many noninhaled euthanasia agents can induce a state of unconsciousness during which minimal vital functions are evident but from which some animals may recover. Therefore, as for any euthanasia method, death must be confirmed prior to final disposition of the animal's remains.

#### **M2.1.1 COMPOUNDING**

Products approved by the Center for Veterinary Medicine at the FDA should be used whenever feasible. When not feasible, euthanasia agents compounded in compliance with applicable guidance document(s) and compliance policy guide(s) in effect at the time of euthanasia should be used whenever feasible.<sup>152</sup> Use of compounded euthanasia drugs that may create human or animal health risks (eg, unintentional ingestion by other animals) is of concern.

#### **M2.1.2 Residue/Disposal Issues**

Animals euthanized by chemical means must never enter the human food chain and should be disposed of in accord with local, state, and federal laws. Disposal of euthanized animals has become increasingly problematic because most rendering facilities will no longer take animals euthanized with agents that pose residue hazards (eg, barbiturates). The potential for ingestion of euthanasia agents is an important consideration in the euthanasia of animals that are disposed of in outdoor settings where scavenging by other animals is possible<sup>153</sup> or when euthanized animals are fed to zoo and exotic animals.<sup>154</sup> Veterinarians and laypersons have been fined for causing accidental deaths of endangered birds that ingested animal remains that were poorly buried.<sup>155</sup> Environmental warnings must now be included on animal euthanasia drugs approved by the FDA Center for Veterinary Medicine.<sup>156</sup>

### **M2.2 ROUTES OF ADMINISTRATION**

#### **M2.2.1 PARENTERAL INJECTION**

The use of injectable euthanasia agents is one of the most rapid and reliable methods of performing

euthanasia. It is usually the most desirable method when it can be performed without causing fear or distress in the animal. When appropriately administered, acceptable injectable euthanasia agents result in smooth loss of consciousness prior to cessation of cardiac and/or respiratory function, minimizing pain and distress to the animal. However, heightened awareness for personnel safety is imperative when using injectable euthanasia agents because needle-stick injuries involving these drugs have been shown to result in adverse effects (41.6% of the time); 17% of these adverse effects were systemic and severe.<sup>157</sup>

Intravenous injections deliver euthanasia agents directly into the vascular system, allowing for rapid distribution of the agent to the brain or neural centers, resulting in rapid loss of consciousness (for some invertebrates with closed circulatory systems, intrahemolymph injection is considered analogous to IV injection).<sup>158</sup> When the restraint necessary for giving an animal an IV injection is likely to impart added distress to the animal or pose undue risk to the operator, sedation, anesthesia, or an acceptable alternate route or method of administration should be used. Aggressive or fearful animals should be sedated prior to restraint for IV administration of the euthanasia agent. Paralytic immobilizing agents (eg, neuromuscular blocking agents) are unacceptable as a sole means of euthanasia, because animals under their influence remain awake and able to feel pain. Having said this, there may be select circumstances (eg, for wild or feral animals) where the administration of paralytic agents (eg, neuromuscular blocking agents) may be the most rapid and humane means of restraint prior to euthanasia due to their more rapid onset compared with other immobilizing agents.<sup>159</sup> In such situations, paralytic immobilizing agents may only be used if the chosen method of euthanasia (eg, captive bolt, IV injection of euthanasia solution) can be applied immediately following immobilization. Paralytic immobilizing agents must never be used as a sole means of euthanasia, nor should they be used if delay is expected between immobilization and euthanasia.

When intravascular administration is considered impractical or impossible, IP or intracoelomic administration of a nonirritating<sup>160</sup> barbiturate or other approved solution is acceptable. In laboratory rats, addition of lidocaine or bupivacaine to pentobarbital reduced abdominal writhing following intraperitoneal injection.<sup>161</sup> Intracoelomic administration of buffered MS 222<sup>a</sup> is acceptable for some poikilotherms. When injectable euthanasia agents are administered into the peritoneal or coelomic cavities, vertebrates may be slow to pass through stages I and II of anesthesia.<sup>162</sup> Accordingly, they should be placed in small enclosures in quiet areas to minimize excitement and trauma. Intra-abdominal administration of euthanasia agents is an acceptable means of delivery in invertebrates with open circulatory systems.

In anesthetized mice, retrobulbar injection of no

more than 200 µL of injectable anesthetic solution (ketamine:xylazine) is acceptable with conditions, resulting in death within 5 seconds of cessation of injection.<sup>163</sup> Intraosseous administration of some euthanasia solutions to awake animals may cause pain due to the viscosity of the agent, chemical irritation, or other reasons.<sup>164</sup> Administration of analgesics, slower injection of euthanasia agent, and other strategies that may reduce discomfort should be used where possible when administering euthanasia agents through preexisting intraosseous catheters.<sup>165</sup> Placement of intraosseous (greater trochanter of the femur, greater tubercle of the humerus, medial aspect of the proximal tibia) catheters for administration of euthanasia agents and intracardiac, intrahepatic, intrasplenic, or intrarenal injections are acceptable only when performed on anesthetized or unconscious animals (with the exception of intrahepatic injections in cats as discussed in the Companion Animals section of the text). These routes are not acceptable in awake mammals and birds due to the difficulty and unpredictability of performing the techniques accurately with minimal discomfort. In some poikilotherms for which intracardiac puncture is the standard means of vascular access (eg, some snakes and other reptiles), intracardiac administration of euthanasia solutions in awake animals is acceptable. With the exceptions of IM delivery of ultrapotent opioids (ie, etorphine and carfentanil) and IM delivery of select injectable anesthetics, IM, SC, intrathoracic, intrapulmonary, intrathecal, and other nonvascular injections are not acceptable routes of administration for injectable euthanasia agents in awake animals.

## **M2.2.2 IMMERSION**

Euthanasia of fish and some aquatic amphibians and invertebrates must take into account the vast differences in metabolism, respiration, and tolerance to cerebral hypoxia among the various aquatic species. Because aquatic animals have diverse physiologic and anatomic characteristics, optimal methods for delivery of euthanasia agents will vary. In many situations, the immersion of aquatic animals in water containing euthanasia agents is the best way to minimize pain and distress. The response of aquatic animals to immersion agents can vary with species, concentration of agent, and quality of water; consideration of these factors should be made when selecting an appropriate euthanasia agent. Immersion agents added to water may be absorbed by multiple routes, including across the gills, via ingestion, and/or through the skin.

Ideally, immersion agents added to water will be nonirritating to skin, eyes, and oral and respiratory tissues and will result in rapid loss of consciousness (often, but not always, measured as a loss of righting response) with minimal signs of distress or avoidance behavior. Currently there are no US FDA-approved drugs for the euthanasia of aquatic animals. United States EPA-registered agents for poisoning fish (eg,

rotenone, antimycin) are not recommended as euthanasia agents, because their mechanisms of action and times to death do not fit the criteria for euthanasia. Additionally, the use of these agents requires a restricted pesticide applicator's license and extralabel use of these agents is a violation of federal law. Agents approved by the FDA as tranquilizers and anesthetics for fish (eg, MS 222, metomidate) have been used extralabel as euthanasia agents for aquatic animals.

## **M2.2.3 TOPICAL APPLICATION**

Absorption of topically applied agents is slow and variable, making topical application an unacceptable means of efficient delivery of euthanasia agents for most animals. Exceptions include animals with highly permeable skin to which nonirritating, rapidly absorbed agents are applied (eg, amphibians euthanized with benzocaine gel). Currently there are no topical euthanasia agents that are US FDA approved for any species.

## **M2.2.4 ORAL ADMINISTRATION**

The oral route has several disadvantages when considered for administration of euthanasia agents, including lack of established drugs and doses, variability in agent bioavailability and rate of absorption, potential difficulty of administration (including potential for aspiration), and potential for loss of agent through vomiting or regurgitation (in species that are capable of these functions). For these reasons, the oral route is unacceptable as a sole means of euthanasia. However, the oral route is an appropriate means to deliver sedatives prior to administration of parenteral euthanasia agents.

## **M2.3 BARBITURIC ACID DERIVATIVES**

Barbiturates depress the CNS in descending order, beginning with the cerebral cortex, with loss of consciousness progressing to anesthesia. With an overdose, deep anesthesia progresses to apnea due to depression of the respiratory center, and this is followed by cardiac arrest.

All barbituric acid derivatives used for anesthesia are acceptable for euthanasia when administered IV. There is a rapid onset of action, and loss of consciousness induced by barbiturates results in minimal or transient pain associated with venipuncture. Desirable barbiturates are those that are potent, nonirritating, long acting, stable in solution, and inexpensive. Sodium pentobarbital best fits these criteria and is most widely used, although others such as secobarbital are also acceptable. More research into the efficacy, speed of action, and nociceptive responses of nonvascular routes of barbiturate euthanasia solutions is needed before changes in recommendations for these alternate routes can be made.

*Advantages*—(1) A primary advantage of barbiturates is speed of action. This effect depends on the dose, concentration, route, and rate of the injec-

tion. (2) Barbiturates induce euthanasia smoothly, with minimal discomfort for the animal. (3) Barbiturates are less expensive than many other euthanasia agents. (4) Food and Drug Administration–approved barbiturate-based euthanasia solutions are readily available.

*Disadvantages*—(1) Intravenous injection is necessary for best results and this requires trained personnel. (2) Each animal must be appropriately restrained. (3) Current federal drug regulations require strict accounting for barbiturates, and these must be used under the supervision of personnel registered with the US DEA. (4) An aesthetically objectionable terminal gasp may occur in unconscious animals. (5) Some animals may go through an excitatory phase that may be distressing to observers. (6) These drugs persist in the animal's remains and may cause sedation or even death of animals that consume the body. (7) Tissue artifacts (eg, splenomegaly) may occur in some species euthanized with barbiturates.

*General recommendations*—The advantages of using barbiturates for euthanasia in dogs and cats far outweigh the disadvantages. Intravenous injection of a barbituric acid derivative is the preferred method for euthanasia of dogs, cats, other small animals, and horses. Barbiturates are also acceptable for all other species of animals if circumstances permit their use. Intraperitoneal or intracoelomic injection may be used in situations when an IV injection would be distressful, dangerous, or difficult due to small patient size. Intracardiac (in mammals and birds), IM, intrahepatic, and intrarenal injections must only be used if the animal is unconscious or anesthetized (with the exception of intrahepatic injections in cats as discussed in the Companion Animals section of the text).

## M2.4 PENTOBARBITAL COMBINATIONS

Several euthanasia products combine a barbituric acid derivative (usually sodium pentobarbital) with local anesthetic agents, other CNS depressants (eg, phenytoin, ethanol), or agents that metabolize to pentobarbital. Although some of the additives are slowly cardiotoxic, euthanasia makes this pharmacologic effect inconsequential. These combination products are listed by the DEA as schedule III drugs, making them somewhat simpler to obtain, store, and administer than schedule II drugs such as sodium pentobarbital. The pharmacologic properties and recommended use of euthanasia products that combine sodium pentobarbital with agents such as lidocaine or phenytoin are interchangeable with those of pure barbituric acid derivatives.

Mixing of pentobarbital with a neuromuscular blocking agent in the same injection apparatus is not an acceptable approach to euthanasia because of the potential for the neuromuscular blocking agent to induce paralysis prior to onset of unconsciousness.

## M2.5 TRIBUTAME

Tributame euthanasia solution is an injectable, nonbarbiturate euthanasia agent with each milliliter containing 135 mg of embutramide, 45 mg of chloroquine phosphate USP, and 1.9 mg lidocaine USP dissolved in water and ethyl alcohol. The final formulation has a teal blue color with the bittering agent, denatonium benzoate, added to minimize the risk of the solution being ingested accidentally. Tributame was approved by the FDA in 2005 as an IV agent for euthanasia of dogs, and embutramide was classified as a schedule III controlled substance in 2006, making Tributame a C-III controlled agent.<sup>166–168</sup>

Embutramide is a derivative of  $\gamma$ -hydroxybutyrate that was investigated as a general anesthetic in the late 1950s, but was never used as a pharmaceutical agent due to a poor margin of safety, with severe cardiovascular effects including hypotension, myocardial depression, and ventricular dysrhythmias.<sup>169</sup> Embutramide can be injected alone to cause death, but the time until death can exceed 5 minutes. Subsequently, chloroquine phosphate, an antimalarial drug with profound cardiovascular depressant effects, was added to embutramide, and studies verified a significantly shorter time until death.<sup>170,171</sup> Studies on dogs showed this combination of 2 drugs to be effective, but when tested for euthanasia of cats, a substantial response to IV injection via peripheral vein was evident. This effect was almost completely eliminated by addition of lidocaine. The addition of chloroquine and lidocaine also lowers the dosage of embutramide required for euthanasia.<sup>170</sup> Death from Tributame results from severe CNS depression, hypoxia, and circulatory collapse.

Tributame produces unconsciousness in dogs in fewer than 30 seconds, with death occurring within 2 minutes; agonal breathing may occur in 60% to 70% of patients.<sup>172</sup> Injection is to be given IV over a period of 10 to 15 seconds through a preplaced catheter or hypodermic needle at a dosage of 1 mL for each 5 lb (0.45 mL/kg [0.2 mL/lb]).

*Advantages*—(1) Tributame has a rapid onset of action. This effect depends on the dose, concentration, route, and rate of the injection. (2) Tributame induces euthanasia smoothly, with minimal discomfort to the animal. (3) Schedule III status makes Tributame somewhat simpler to obtain, store, and administer than Schedule II drugs such as sodium pentobarbital.

*Disadvantages*—(1) At the time of compilation of this report, while Tributame is FDA approved for use in dogs, it is not currently being manufactured. (2) Intravenous injection by trained personnel is necessary. (3) Each animal must be individually restrained. (4) Aesthetically objectionable agonal breathing may occur in unconscious animals. (5) The component drugs tend to persist in the animal's remains and may cause sedation or even death of animals that consume the body.

*General recommendations*—If it becomes available, Tributame is an acceptable euthanasia drug for



dogs provided that it is administered IV by a highly skilled person at recommended dosages and at proper injection rates. If barbiturates are not available, its extralabel use in cats is also acceptable. Routes of administration of Tributame other than IV injection are not acceptable.

## M2.6 T-61

T-61 is an injectable, nonbarbiturate, nonnarcotic mixture of embutramide, mebozonium (mebenzonium) iodide, and tetracaine hydrochloride.<sup>172</sup> Embutramide induces narcosis and respiratory depression, while mebozonium causes nondepolarizing muscular paralysis.<sup>173</sup> Concern has been expressed that the paralytic effect of mebozonium occurs before embutramide-induced unconsciousness, creating a potential for animal distress prior to loss of consciousness, as manifested by muscular activity and/or vocalization during injection. However, electrophysiologic studies in dogs and rabbits have shown that loss of consciousness and loss of motor activity occur simultaneously following T-61 injection.<sup>174</sup> Although many consider the aesthetically unpleasant reactions of dogs to T-61 injection to be similar to dysphoria seen during the induction phases of anesthesia, the behavior demonstrated during these reactions can cause distress in personnel witnessing euthanasia. Because of these concerns, T-61 has been voluntarily withdrawn from the market by the manufacturer and is no longer manufactured or commercially available in the United States, although it is available in Canada and other countries. T-61 should be administered only IV and at carefully monitored rates of injection to avoid dysphoria during injection.

*Advantages*—(1) T-61 has a rapid onset of action and has been used to euthanize dogs, cats, horses, laboratory animals, birds, and wildlife. (2) Terminal (agonal) gasps that can occur in animals euthanized by IV barbiturates are not seen with use of T-61.

*Disadvantages*—(1) T-61 is currently not being manufactured in the United States. (2) Slow IV injection is necessary to avoid dysphoria prior to unconsciousness. (3) Each animal must be appropriately restrained and the agent must be administered by trained personnel. (4) Secondary toxicosis may occur in animals that consume remains of animals euthanized with T-61. (5) Because T-61 contains embutramide, a schedule III controlled drug, it is subject to the same restrictions in acquisition, storage, and use as other schedule III agents.

*General recommendations*—T-61 is acceptable as an agent of euthanasia provided it is administered appropriately by trained personnel. Routes of administration of T-61 other than IV are not acceptable.

## M2.7 ULTRAPOTENT OPIOIDS

Etorphine hydrochloride and carfentanil citrate are ultrapotent opioids (10,000 times as potent as morphine sulfate) that are FDA approved for the immobilization of wildlife.<sup>175</sup> These opioids have been

used as immobilization and extralabel euthanasia drugs primarily for large animals, particularly wildlife. Carfentanil has been used transmucosally in a lollipop form to euthanize captive large apes.<sup>176</sup> These drugs act on  $\mu$  opioid receptors to cause profound CNS depression, with death secondary to respiratory arrest.

*Advantages*—(1) Etorphine and carfentanil can be delivered IM or transmucosally in situations where IV administration is unfeasible or dangerous. (2) These drugs have a rapid onset of action.

*Disadvantages*—(1) These drugs are strictly regulated, require special licensing to obtain and use, and are not FDA approved for use as agents of euthanasia. (2) There is substantial risk for humans handling the drugs, which can be absorbed through broken skin or mucous membranes. (3) These opioids may pose a risk of secondary toxicosis if the remains of euthanized animals are ingested; therefore proper disposal of animal remains is essential.

*General recommendations*—Etorphine or carfentanil is acceptable with conditions for euthanasia only in situations where use of other euthanasia methods is impractical or dangerous. Personnel handling the drugs must be familiar with their hazards, and a second person must be standing by and be prepared to summon medical support and administer first aid in case of accidental human exposure.

## M2.8 DISSOCIATIVE AGENTS AND $\alpha_2$ -ADRENERGIC RECEPTOR AGONISTS

Injectable dissociative agent and  $\alpha_2$ -adrenergic receptor agonists induce rapid loss of consciousness, and sometimes muscle relaxation, prior to surgery, dentistry, or other procedures. These agents are sometimes given prior to administration of euthanasia solutions to minimize animal distress, facilitate restraint, and/or provide a more aesthetic euthanasia environment for owner-attended euthanasia. In overdose situations, these agents can cause death; however, doses that consistently will produce death have not been established for most species. In mice, injection of 100  $\mu$ L of a 10:1 (mg:mg) solution of ketamine:xylazine resulted in death within 3 to 5 seconds after completion of the injection.<sup>163</sup> Intraperitoneal injection of dissociative agents in combination with  $\alpha_2$ -adrenergic receptor agonists at 5 times the anesthetic dose has been used as a means of euthanizing laboratory animals.<sup>177</sup>

*Advantages*—(1) These agents are readily available. (2) The combination of these agents causes rapid loss of consciousness. (3) Although IV injection for euthanasia is preferred, these combinations can be delivered IM in situations where IV administration is not feasible or is dangerous.

*Disadvantages*—(1) These agents are not FDA approved for use as agents of euthanasia. (2) Doses that consistently produce rapid death have not been established for most drugs and species. (3) The cost

of the higher doses of agents required to cause death may substantially exceed that of an approved euthanasia agent. (4) Many dissociative agents are controlled substances and their acquisition, storage, and use are restricted. (5) Some injectable agents can be hazardous for human personnel if accidental exposure occurs. (6) The environmental impact of residues of injectable anesthetics in the remains of euthanized animals has not been determined.

*General recommendations*—In species for which effective euthanasia doses and routes have been established, overdose of dissociative agent- $\alpha_2$ -adrenergic combinations is an acceptable method of euthanasia. These agents are acceptable with conditions in situations where approved euthanasia drugs are not available or as secondary means of euthanasia in already anesthetized animals provided utmost care is taken to ensure that death has occurred prior to disposing of animal remains. These combinations are also acceptable as the first step in a 2-step euthanasia method. Until the environmental impact of tissue residues is determined, special care must be taken in the disposal of animal remains. Injectable anesthetics should not be used in animals intended for consumption.

## M2.9 POTASSIUM CHLORIDE AND MAGNESIUM SALTS

Although unacceptable when used in conscious vertebrate animals, a solution of potassium chloride, magnesium chloride, or magnesium sulfate injected IV or intracardially in an animal that is unconscious or under general anesthesia is an acceptable way to induce cardiac arrest and death. The potassium ion is cardiotoxic, and rapid IV or intracardiac administration of 1 to 2 mmol/kg (0.5 to 0.9 mmol/lb) of body weight (1 to 2 mEq K<sup>+</sup>/kg; 75 to 150 mg of potassium chloride/kg [34.1 to 68.2 mg/lb]) will cause cardiac arrest.<sup>178</sup> This is an injectable technique for euthanasia of livestock or wildlife species that may reduce the risk of toxicosis for predators or scavengers in situations where the remains of euthanized animals may be consumed.<sup>179,180</sup> Potassium chloride injected IV at 3 mg/kg (1.4 mg/lb) into parrots anesthetized with isoflurane caused mild vocalization in 1 of 6 birds and resulted in asystole in 68 seconds.<sup>181</sup> Use of 10 mg/kg (4.5 mg/lb) IV in anesthetized parrots resulted in involuntary muscle tremors in 5 of 6 birds and caused asystole in 32.8 seconds. Neither dosage resulted in histologic artifacts.

Magnesium salts may also be mixed in water for use as immersion euthanasia agents for some aquatic invertebrates. In these animals, magnesium salts induce death through suppression of neural activity.<sup>181</sup>

*Advantages*—(1) Potassium chloride and magnesium salts are not controlled substances and are easily acquired, transported, and mixed in the field. (2) Potassium chloride and magnesium salt solutions, when administered after rendering an animal unconscious, result in animal remains that are potentially

less toxic for scavengers and predators and may be a good choice in cases where proper disposal of animal remains (eg, rendering, incineration) is impossible or impractical.

*Disadvantages*—(1) Rippling of muscle tissue and clonic spasms may occur upon or shortly after injection. (2) Potassium chloride and magnesium salt solutions are not approved by the FDA for use as euthanasia agents. (3) Saturated solutions are required to obtain suitable concentrations for rapid injection into large animals.

*General recommendations*—Personnel performing this technique must be trained and knowledgeable in anesthetic techniques, and be competent in assessing the level of unconsciousness that is required for administration of potassium chloride and magnesium salt solutions IV. Administration of potassium chloride or magnesium salt solutions IV requires animals to be in a surgical plane of anesthesia characterized by loss of consciousness, loss of reflex muscle response, and loss of response to noxious stimuli. Use in unconscious animals (made recumbent and unresponsive to noxious stimuli) is acceptable in situations where other euthanasia methods are unavailable or not feasible. Although no scavenger toxicoses have been reported with potassium chloride or magnesium salts in combination with a general anesthetic, proper disposal of animal remains should always be attempted to prevent possible toxicosis by consumption of animal remains contaminated with general anesthetics.

## M2.10 CHLORAL HYDRATE AND $\alpha$ -CHLORALOSE

Chloral hydrate (1,1,1-trichloro-2,2-dihydroxyethane) was once used in combination with magnesium sulfate and sodium pentobarbital as an economical anesthesia and euthanasia agent for large animals, but now is rarely used for this application in veterinary medicine.  $\alpha$ -Chloralose is a longer-acting derivative of chloral hydrate that has been used for anesthesia of laboratory animals, particularly for study of cerebrovasculature.<sup>182,183</sup> When administered IV, these agents have almost immediate sedative action, but unless combined with other anesthetics, the onset of anesthesia is delayed. Death is caused by hypoxemia resulting from progressive depression of the respiratory center, and may be preceded by gasping, muscle spasms, and vocalization.

*Advantages*—(1) Historically, chloral hydrate was an inexpensive anesthetic and euthanasia agent, making it economical for large animals. (2) Schedule IV status makes chloral hydrate somewhat simpler to obtain, store, and administer than schedule II or III drugs, such as sodium pentobarbital.

*Disadvantages*—(1) Chloral hydrate depresses the cerebrum slowly; therefore, restraint may be a problem for some animals. (2) Chloral hydrate is no longer available as an FDA-approved drug in the United States, so it must be compounded from bulk drug.

This is problematic because of the lack of manufacturing controls, tests for potency, and potential illegality of using products made from bulk drugs.

**General recommendations**—Chloral hydrate and  $\alpha$ -chloralose are not acceptable euthanasia agents because the associated adverse effects may be severe, reactions can be aesthetically objectionable, and other products are better choices.

## M2.11 ALCOHOLS

Ethanol and other alcohols increase cell membrane fluidity, alter ion channels within neural cells, and decrease nerve cell activity.<sup>184</sup> Alcohols induce death through nervous system and respiratory depression, resulting in anesthesia and anoxia. Alcohols have been used as secondary euthanasia methods for some fish species<sup>185</sup> and as primary injectable euthanasia agents in laboratory mice 35 days of age or older.<sup>186</sup> Intraperitoneal injection of ethanol has been used for the euthanasia of laboratory mice (*Mus musculus*) and rats (*Rattus norvegicus*).<sup>187</sup> Mice receiving IP injections of 0.5 mL of 70% ethanol developed gradual loss of muscle control, coma, and death within 2 to 6 minutes. However, mice < 35 days of age experienced prolonged time to death following IP ethanol administration, so this method is not appropriate in mice in this age group or for neonatal mice (*M musculus*).<sup>188</sup> This method is not appropriate for euthanasia of rats due to volume of ethanol required and prolonged time to respiratory effects.<sup>187</sup> Tribromoethanol is used as an anesthetic agent in laboratory rodents.

**Advantages**—(1) Alcohol is inexpensive and readily available.

**Disadvantages**—(1) Alcohols produce dose-related irritation to tissue. (2) Onset of insensibility and death can be delayed following alcohol administration. (3) The volume required to euthanize animals larger than mice renders most alcohols impractical as euthanasia agents. (4) Alcohols are not FDA approved as euthanasia agents. (5) Tribromoethanol is not commercially available as a pharmaceutical-grade product and must be compounded.

**General recommendations**—Ethanol in low concentrations is an acceptable secondary means of euthanasia in fish rendered insensible by other means and as a primary or secondary means of euthanasia of some invertebrates. Immersion in high concentrations (eg, 70%) of ethanol is not acceptable. Ethanol is acceptable with conditions as an agent of euthanasia for mice 35 days of age and older, but is unacceptable as an agent of euthanasia for larger species. Tribromoethanol is acceptable with conditions as a method for euthanasia of laboratory rodents when approved by the IACUC and prepared, stored, and administered at the appropriate dosage.

## M2.12 MS 222 (TMS)

Tricaine methanesulfonate, commonly referred to as MS 222, is an anesthetic agent that is FDA ap-

proved for temporary immobilization of fish, amphibians, and other aquatic, cold-blooded animals.<sup>189</sup> Tricaine methanesulfonate has been used for euthanasia of reptiles, amphibians, and fish. Tricaine is a benzoic acid derivative and, in water of low alkalinity (< 50 mg/L as CaCO<sub>3</sub>), the solution should be buffered with sodium bicarbonate.<sup>190</sup> A 10 g/L stock solution can be made, and sodium bicarbonate added to saturation, resulting in a pH between 7.0 and 7.5 for the solution. The stock solution should be protected from light and refrigerated or frozen if possible. The solution should be replaced monthly and any time a brown color is observed.<sup>191</sup> Potency is increased in warm water and decreased in cold water.<sup>190</sup> Immersion of fish in solutions of MS 222 for 30 minutes following loss of rhythmic opercular movement is sufficient for euthanasia of most fish. Due to species differences in response to MS 222, a secondary method of euthanasia is recommended in many fish to ensure death.<sup>190,192</sup> In the United States, there is a 21-day withdrawal time for MS 222; therefore, it is not appropriate for euthanasia of animals intended for consumption.

MS 222 rapidly enters the CNS and alters nerve conduction through blockade of voltage-sensitive sodium channels.<sup>192</sup> Additionally, accumulation within ventricular myocardium results in decreased cardiovascular function. Death is due to decreased nervous and cardiovascular function.

Studies<sup>193</sup> with *Xenopus laevis* (African clawed frog or platanna) have shown that the concentrations of MS 222 traditionally used for amphibian euthanasia (0.25 to 0.5 g/L) are not sufficient to induce reliable euthanasia in this species. Immersion of frogs in 5 g/L of MS 222 resulted in deep anesthesia within 4 minutes, but at least 1 hour of immersion at this concentration was required to reliably euthanize 100% of frogs. The authors of that study recommended that if a concentration of MS 222 < 5 g/L or a shorter time frame than 1 hour is allowed, a secondary euthanasia method should be used for *X laevis*. Intracoelomic injection of MS 222 at the highest possible dosage (2,590 mg/kg [1,177 mg/lb]) did not result in euthanasia, with 6 of 20 frogs regaining mobility within 3 hours after injections. Consequently, intracoelomic injection of MS 222 is not considered to be an acceptable method of euthanasia for *X laevis* and possibly other amphibians.

A 2-stage euthanasia method for reptiles using MS 222 has been described.<sup>172</sup> The first stage entails intracoelomic injection of 250 to 500 mg/kg (113.6 to 227.3 mg/lb) of a pH-neutralized solution (0.7% to 1.0% MS 222), which results in rapid loss of consciousness (< 30 seconds to 4 minutes). Once unconsciousness occurs, a second intracoelomic injection of unbuffered 50% MS 222 is administered.

**Advantages**—(1) Tricaine methanesulfonate is soluble in both fresh and salt water and can be used for a wide variety of fish, amphibians, and reptiles. (2) Tricaine methanesulfonate is commercially available and is not a controlled substance, which increases ease of acquisition, storage, and administration.

**Disadvantages**—(1) Tricaine methanesulfonate is expensive and may be cost prohibitive for use for large fish, amphibians, and reptiles or for large populations. (2) There appears to be substantial species variability in response to MS 222, with some species requiring higher doses or secondary measures to ensure death. (3) Injection of MS 222 is not appropriate for fish as rapid excretion via the gills renders it ineffective by this route.<sup>190</sup> (4) Tricaine methanesulfonate cannot be used in animals intended for human consumption. (5) Occupational exposure to MS 222 has been associated with retinal toxicity in humans.<sup>194</sup> (6) Tricaine methanesulfonate is not FDA approved for use as an agent of euthanasia. (7) The impact of MS 222 residues in euthanized fish on the environment or scavenger species has not been determined.

**General recommendations**—Tricaine methanesulfonate is an acceptable method of euthanasia for fish and for some amphibians and reptiles. When used for some fish and some amphibians (eg, *Xenopus* spp), a secondary method should be used to ensure death. By itself, intracoelomic injection of MS 222 is not an acceptable euthanasia method for *X. laevis* and possibly other amphibians. Animals euthanized with MS 222 should not be used as food sources for humans or other animals.

## M2.13 BENZOCAINE HYDROCHLORIDE

Benzocaine base, a compound similar to MS 222, is not water soluble and therefore is prepared as a stock solution (100 g/L) with acetone or ethanol; the presence of these solvents can be irritating to tissues. Conversely, benzocaine hydrochloride is water soluble and can be used directly for either anesthesia or euthanasia of fish and amphibians.<sup>172,191</sup> Benzocaine-containing products should be protected from light and protected from freezing or excessive heat (> 40°C). Topical application of 7.5% or 20% benzocaine hydrochloride gel on an amphibian's ventrum is effective and does not require buffering. Similarly to MS 222, benzocaine acts through blockade of voltage-sensitive sodium channels within the CNS and heart, resulting in depression of the nervous and cardiovascular systems.

The application of benzocaine hydrochloride gel to the ventral abdomen of amphibians (20% concentration; 2.0-cm X 1.0-mm application) is an effective means of anesthesia and euthanasia for some species.<sup>193,195,196</sup> Following application of the gel to the ventrum of *X. laevis* and placement in a wet bucket, righting and withdrawal reflexes subsided within 7 minutes, and death occurred within 5 hours.<sup>193</sup> No evidence of dermal injury, loss of dermal hydration, or difficulty breathing was associated with topical application of benzocaine hydrochloride gel to amphibians. A recent investigation on euthanasia of adult *X. laevis* describes a dose of 182 mg/kg (82.7 mg/lb) of benzocaine hydrochloride gel as effective.<sup>193</sup>

A comparison of benzocaine hydrochloride application with ice-slurry immersion for euthanasia of bony bream (*Nematalosa erebi*) indicated that, for certain warm water fish species, an ice-slurry elicits less motor response than benzocaine overdose as a method of euthanasia, but additional work is needed to determine the most humane method.<sup>197</sup>

**Advantages**—(1) Benzocaine hydrochloride is a relatively fast-acting and effective euthanasia agent for fish and amphibians. (2) Benzocaine hydrochloride is not a controlled substance. (3) Benzocaine hydrochloride has low toxicity for humans at concentrations used to euthanize fish. (4) Benzocaine hydrochloride poses little environmental risk as it is readily filtered by use of activated carbon and breaks down in water within approximately 4 hours.

**Disadvantages**—(1) Benzocaine hydrochloride is not FDA approved for use as an agent of euthanasia. (2) Benzocaine hydrochloride may be cost prohibitive for euthanasia of larger fish, amphibians, and reptiles or large populations. (3) Benzocaine hydrochloride solutions must be carefully buffered to avoid tissue irritation. (4) The impact of benzocaine residues in euthanized fish on the environment or scavenger species has not been determined.

**General recommendations**—Benzocaine hydrochloride gel and solutions are acceptable agents for euthanasia for fish and amphibians. Benzocaine hydrochloride is not an acceptable euthanasia agent for animals intended for consumption.

## M2.14 EUGENOL

Cloves contain a number of essential oils, including eugenol, isoeugenol, and methyleugenol.<sup>198</sup> Eugenol comprises 85% to 95% of the essential oils in cloves, and has been used as a food flavoring and a local anesthetic for human dentistry. Eugenol is classified as a “generally regarded as safe” food additive by the FDA and as an exempted least-toxic pesticide active ingredient by the US EPA. Eugenol exhibits antifungal, antibacterial, antioxidant, and anticonvulsant activity. Some other components of clove oil, such as isoeugenol, are equivocal carcinogens based on studies in rodents.<sup>199</sup> Clove oil and its extracts have become popular as anesthetic agents for freshwater and marine fish because of their wide availability, low cost, and shorter induction times when compared with MS 222.<sup>200,201</sup> When compared with MS 222 as an anesthetic agent, eugenol was found to have a more rapid induction, prolonged recovery, and narrow margin of safety, as it can cause rapid onset of ventilatory failure at high concentrations (> 400 mg/L).<sup>202</sup>

The anesthetic mechanism of clove oil and its derivatives has been poorly studied, but they appear to act similarly to other local anesthetics by inhibition of voltage-sensitive sodium channels within the nervous system.<sup>175</sup> Studies<sup>203-205</sup> of rodents indicate this class of agents may cause paralysis in addition to their anesthetic effects.

*Advantages*—(1) Clove oil and its derivatives are widely available, are relatively inexpensive, and are not controlled substances. (2) These agents have a short induction time. (3) Clove oil and its derivatives are effective at a wide range of water temperatures. (4) Eugenol has low risk for human toxicity at concentrations used for euthanasia of fish.

*Disadvantages*—(1) Clove oil and its derivatives are not FDA approved for use as an agent of euthanasia. (2) Animals euthanized with clove oil products are not approved for human consumption. (3) Some clove oil derivatives are potential carcinogens. (4) The impact of clove oil residues in euthanized fish on the environment or scavenger species has not been determined.

*General recommendations*—Clove oil, isoeugenol, and eugenol are acceptable agents of euthanasia for fish. It is recommended that, whenever possible, products with standardized, known concentrations of essential oils be used so that accurate dosing can occur. These agents are not acceptable means of euthanasia for animals intended for consumption.

## **M2.15 2-PHENOXYETHANOL**

Immersion in 2-phenoxyethanol has been used for anesthesia and euthanasia of fish at concentrations of 0.3 to 0.5 mg/L or higher.<sup>200</sup> The solubility of 2-phenoxyethanol is reduced in colder water. The mechanism of action of 2-phenoxyethanol is poorly understood, but death is thought to occur from hypoxia secondary to CNS depression. Fish should be kept in the 2-phenoxyethanol solution for at least 10 minutes after cessation of opercular movement.

*Advantages*—(1) 2-phenoxyethanol can be used in a 1-step immersion method for euthanasia of fish. (2) 2-phenoxyethanol is not a controlled substance.

*Disadvantages*—(1) Induction times can be prolonged. (2) There are species variations in dosage levels and duration of exposure required for euthanasia. (3) Some species exhibit hyperactivity prior to loss of consciousness. (4) 2-phenoxyethanol is not FDA approved for use as an agent of euthanasia. (5) The impact of 2-phenoxyethanol residues in euthanized fish on the environment or scavenger species has not been determined.

*General recommendations*—Although there are probably more efficient immersion agents available, 2-phenoxyethanol is an acceptable method of euthanasia for fish under certain circumstances. 2-phenoxyethanol is not an acceptable means of euthanasia in animals intended for consumption.

## **M2.16 QUINALDINE (2-METHYLQUINOLINE, QUINALDINE SULFATE)**

Quinaldine has low solubility in water and therefore must first be dissolved in acetone or alcohol and then buffered with bicarbonate.<sup>200</sup> The potency of quinaldine varies with species, water temperature, water pH, and mineral content of water. Quinaldine

acts through depression of sensory centers of the CNS.

*Advantages*—(1) Quinaldine can be used in a 1-step immersion method for euthanasia of fish. (2) Quinaldine is not a controlled substance.

*Disadvantages*—(1) Quinaldine is not FDA approved for use as an agent of euthanasia. (2) The impact of quinaldine residues in euthanized fish on the environment or scavenger species has not been determined.

*General recommendations*—Quinaldine is an acceptable method of euthanasia for fish under certain circumstances. Quinaldine is not an acceptable means of euthanasia in animals intended for consumption.

## **M2.17 METOMIDATE**

Metomidate is a highly water-soluble, nonbarbiturate hypnotic that acts by causing CNS depression. It is a rapidly acting euthanasia compound when used at 10 times the upper limit of the recommended anesthetic dose. Some species of fish require higher concentrations of metomidate to achieve anesthesia.<sup>206</sup> Fish should be kept in the solution for at least 10 minutes following cessation of opercular movement. Metomidate is not an acceptable means of euthanasia in animals intended for human consumption. Metomidate is currently listed as a fish sedative and anesthetic in the FDA Index of Legally Marketed Unapproved New Animal Drugs for Minor Species,<sup>207</sup> which prohibits any off-label use of metomidate.

*Advantages*—(1) Metomidate can be utilized in a 1-step immersion method for euthanasia of fish. (2) Metomidate is not a controlled substance.

*Disadvantages*—(1) Extralabel use of metomidate for euthanasia is prohibited due to its status as an FDA-indexed drug. (2) Some species of fish require higher concentrations of metomidate for anesthesia, making metomidate a poor choice for euthanasia agent for those species. (3) Fish euthanized using metomidate are not acceptable for consumption. (4) The impact of metomidate residues in euthanized fish on the environment or scavenger species has not been determined.

*General recommendations*—Should its regulatory status change to allow its use for euthanasia, metomidate is an acceptable method for euthanasia of some species of fish under certain circumstances. Metomidate is not an acceptable means of euthanasia in animals intended for consumption.

## **M2.18 SODIUM HYPOCHLORITE**

Sodium hypochlorite (bleach) and solutions made from calcium hypochlorite granules act as solvents and oxidants in tissue, resulting in saponification of fatty acids, denaturation of proteins, and derangement of cellular processes.<sup>208</sup> Hypochlorite has been used to euthanize unhatched and hatched zebrafish up to 7 days after fertilization, after which time hatchlings are considered developed beyond an

embryonic form and capable of experiencing distress or pain.<sup>209</sup> Hypochlorite has also been used to terminate embryos in various research settings.

*Advantages*—(1) Sodium hypochlorite and calcium hypochlorite are inexpensive, are readily available, and, at the concentrations used for embryonic and larval stage destruction (1% to 10%), pose minimal hazards to personnel. (2) These products are not controlled substances.

*Disadvantages*—(1) Concentrated hypochlorite solutions are corrosive and pose risk of dermal, ocular, and respiratory injury to personnel if mishandled.

*General recommendations*—When used on early embryonic and larval stages prior to development of nociceptive abilities, application of hypochlorites is an acceptable means of euthanasia. Hypochlorites are unacceptable as the sole means of euthanasia of organisms beyond these embryonic and larval stages.

## M2.19 FORMALDEHYDE

Formaldehyde causes cellular damage through oxidative injury as well as through formation of cross-linkages with DNA, RNA, and proteins.<sup>210</sup> Formaldehyde can be used to euthanize and preserve Porifera (sponges) as these invertebrates lack nervous tissue.

*Advantages*—(1) Formaldehyde is inexpensive, easily obtainable, and not a controlled substance. (2) Formaldehyde rapidly fixes tissues, preserving structure for later study.

*Disadvantages*—(1) Formaldehyde poses substantial health risks for personnel, including respiratory, dermal, and ocular irritation and hypersensitivity. Formaldehyde is also a known human carcinogen.<sup>211</sup>

*General recommendations*—Formaldehyde is an acceptable method of euthanasia for Porifera species. Formaldehyde is acceptable as an adjunctive method of euthanasia for Coelenterates (comb jellies, corals, anemones) and Gastropod molluscs (snails, slugs) only after these animals have been rendered nonresponsive by other methods (eg, magnesium chloride<sup>212</sup>). Formaldehyde is unacceptable as a first step or adjunctive method of euthanasia for other animal species.

## M2.20 LIDOCAINE HYDROCHLORIDE

Lidocaine hydrochloride is a local anesthetic that acts on ion channels of nerves, blocking the movement of sodium into the cell and resulting in failure of nerve conduction due to inability to generate action potentials.<sup>213</sup> Additional alteration of nerve transmission occurs due to lidocaine-induced inhibition of G-protein-coupled receptors and *N*-methyl-D-aspartate receptors.<sup>214</sup> Local anesthetics have occasionally been incorporated into IV barbiturate- or embutramide-based euthanasia solutions, primarily for their cardiodepressant effects.

*Advantages*—(1) Lidocaine is inexpensive, widely available, and not a controlled substance. (2) Lidocaine causes relatively rapid loss of cerebrocortical

function (brain death) when administered intrathecally to anesthetized animals. (3) Lidocaine leaves relatively low tissue residues and is not expected to pose hazards to scavenging animals that might feed on the carcass.<sup>214</sup>

*Disadvantages*—(1) Anesthesia and intrathecal administration require technical expertise to perform. (2) Risk to scavenging animals from anesthetic drug residues must be considered. (3) Reflexive (agonal) breathing occurred occasionally after loss of brain electrical activity. (4) Exposure of personnel to encephalitic diseases (eg, rabies) from CSF removed from animals with unknown illness is possible.

*Recommendations*—Intrathecal 2% lidocaine hydrochloride is an acceptable secondary method of euthanasia in animals under anesthesia in situations where other euthanasia methods are unavailable or cost prohibitive or where proper carcass disposal cannot be assured.

## M2.21 UNACCEPTABLE AGENTS

Strychnine, nicotine, insulin, caffeine, cleaning agents, solvents, pesticides, disinfectants, and other toxicants not specifically designed for therapeutic or euthanasia use are unacceptable for use as euthanasia agents under any circumstances.

Magnesium sulfate, potassium chloride, and neuromuscular blocking agents are unacceptable for use as euthanasia agents in conscious vertebrate animals. These agents may be used for euthanasia of anesthetized or unconscious animals as previously described.

## M3 Physical Methods

### M3.1 COMMON CONSIDERATIONS

Physical methods of euthanasia include captive bolt, gunshot, cervical dislocation, decapitation, electrocution, focused beam microwave irradiation, exsanguination, maceration, stunning, and pithing. When properly used by skilled personnel with well-maintained equipment, physical methods of euthanasia may result in less fear and anxiety and be more rapid, painless, humane, and practical than other forms of euthanasia. Exsanguination, stunning, and pithing are not recommended as a sole means of euthanasia, but may be considered as adjuncts to other agents or methods.

Some consider physical methods of euthanasia aesthetically displeasing. There are occasions, however, when what is perceived as aesthetic and what is most humane are in conflict. Despite their aesthetic challenges, in certain situations physical methods may be the most appropriate choice for euthanasia and rapid relief of pain and suffering. Personnel using physical methods of euthanasia must be well trained and monitored for each type of physical method performed to ensure euthanasia is conducted appropriately. They must also be sensitive to the aesthetic implications of the method and convey to onlookers what they should expect to observe when at all possible.

Since most physical methods involve trauma, there is inherent risk for animals and people. If the method is not performed correctly, personnel may be injured or the animal may not be effectively euthanized; personnel skill and experience are essential. Inexperienced persons should be trained by experienced persons and should practice on euthanized animals or anesthetized animals to be euthanized until they are proficient in performing the method properly and humanely. After the method has been applied, death must be confirmed before disposal of the remains.

### M3.2 PCB

Penetrating captive bolts have been used for euthanasia of ruminants, horses, swine, laboratory rabbits, dogs, and alpacas.<sup>215,216</sup> Standard captive bolts may be inadequate for euthanizing water buffalo.<sup>217</sup> Their mode of action is concussion and trauma to the cerebral hemisphere and brainstem. More recent research<sup>218</sup> in cattle indicates that changing the location of the shot to be a slightly higher location increases the probability of brainstem disruption. Adequate restraint is important to ensure proper placement of captive bolts. A cerebral hemisphere and the brainstem must be sufficiently disrupted by the projectile to induce sudden loss of consciousness and subsequent death. Young steers and heifers were successfully rendered unconscious without disruption of the brainstem with a high-powered, pneumatic PCB.<sup>219</sup>

Appropriate placement of captive bolts for various species has been described.<sup>220–224</sup> Signs of effective captive bolt penetration and death are immediate collapse and a several-second period of tetanic spasm, followed by slow hind limb movements of increasing frequency.<sup>225,226</sup> The corneal reflex must be absent and the eyes must open into a wide blank stare and not be rotated.<sup>227</sup>

There are 2 types of PCBs: a regular PCB and an air injection PCB. In both cases, the bolts penetrate the brain. In the air injection PCB, air under high pressure is injected through the bolt into the brain to increase the extent of tissue destruction. Powder-activated guns that use the traditional captive bolt are available in 9 mm, .22 caliber, and .25 caliber.<sup>220</sup> Captive bolt guns powered by compressed air (pneumatic) are also available in regular and air injection types. All captive bolt guns require careful maintenance and cleaning after each day of use. Lack of maintenance is a major cause of captive bolt gun failure for both powder-activated and pneumatic captive bolt guns.<sup>228</sup> Repeated firing of a captive bolt for extended periods may reduce effectiveness.<sup>229</sup> This is due to the gun becoming overheated.

*Advantages*—(1) Both regular and air injection PCBs may be used effectively for euthanasia of animals in research facilities and on the farm, when the use of drugs for this purpose is inappropriate or impractical. (2) They do not chemically contaminate tissues.

*Disadvantages*—(1) Euthanasia by captive bolt can be aesthetically displeasing. (2) Death may not occur if equipment is not maintained and used properly. (3) The air injection captive bolt must never be used on ruminants that will be used for food because of concerns about contamination of meat with specified risk materials (neurologic tissue). (4) Because the PCB is destructive, brain tissue may not be able to be examined for evidence of rabies infection or chronic wasting disease. Leg-paddling motions that occur after an animal is shot with a captive bolt are spinal reflexes that occur in completely unconscious animals after the spinal cord has been severed at the base of the skull.<sup>230,231</sup>

*General recommendations*—Use of the PCB is acceptable with conditions and is a practical method of euthanasia for horses, ruminants, swine, rabbits, and poultry. To ensure death, it is recommended that animals be immediately exsanguinated or pithed (see adjunctive methods) unless a powerful captive bolt gun designed for euthanasia is used. These guns have recently become available and reduce the need to apply an adjunctive method. Ruminants used for food should not be pithed to avoid contamination of the carcass with specified risk materials. Captive bolt guns used for larger species must have an extended bolt.

### M3.3 NPCB

Research has shown that NPCBs are less effective on cattle than PCBs.<sup>232,233</sup> The NPCB has a wide, mushroom-shaped head that does not penetrate the brain of large mammals, such as adult cattle, slaughter-weight pigs, sows, and adult sheep. In general, NPCB guns only stun animals and should not be used as a sole method of euthanasia. Correct positioning is critical for an effective stun of an adult cow. Nonpenetrating captive bolts are not effective for stunning bulls, adult swine, or cattle with long hair.

Purpose-built or powder-activated pneumatic NPCB guns have recently been developed and successfully used for euthanasia of suckling pigs up to 9 kg (20 lb).<sup>234</sup>

*Advantage*—Less damage to the brain.

*Disadvantages*—(1) Nonpenetrating captive bolt guns only stun animals and therefore are generally not effective as a sole means of euthanasia. The exception is nonpenetrating pneumatic captive bolt guns that have been purpose-built for euthanasia of suckling pigs,<sup>b</sup> neonatal ruminants,<sup>220</sup> and turkeys.<sup>235</sup> (2) Depending on degree of destruction, use of an NPCB may preclude postmortem diagnostics for diseases of the brain, including rabies and chronic wasting disease.

*General recommendations*—In general, NPCB guns should not be used as a sole method of euthanasia. However, pneumatic purpose-built NPCB guns have been used successfully to euthanize suckling pigs,<sup>b</sup> neonatal ruminants,<sup>220</sup> and turkeys.<sup>236</sup>

### **M3.4 MANUALLY APPLIED BLUNT FORCE TRAUMA TO THE HEAD**

Euthanasia by manually applied blunt force trauma to the head must be evaluated in terms of the anatomic features of the species on which it is to be performed, the skill of those performing it, the number of animals to be euthanized, and the environment in which it is to be conducted. Manually applied blunt force trauma to the head can be a humane method of euthanasia for neonatal animals with thin craniums if a single sharp blow delivered to the central skull bones with sufficient force can produce immediate depression of the CNS and destruction of brain tissue. When properly performed, loss of consciousness is rapid. Personnel performing manually applied blunt force trauma to the head must be properly trained and monitored for proficiency with this method of euthanasia, and they must be aware of its aesthetic implications.

Manually applied blunt force trauma to the head has been used primarily to euthanize small laboratory animals with thin craniums.<sup>223,237,238</sup> It has also been applied for euthanasia of young piglets. The anatomic features of neonatal calves make manually applied blunt force trauma to the head unacceptable as a method of euthanasia for this species.

Personnel who have to perform manually applied blunt force trauma to the head often find it displeasing and soon become fatigued. Fatigue can lead to inconsistency in application, creating humane concerns about its efficacious application to large numbers of animals. For this reason, the AVMA encourages those using manually applied blunt force trauma to the head as a euthanasia method to actively search for alternate approaches.

*Advantages*—(1) Blunt force trauma applied manually to the head is inexpensive and effective when performed correctly. (2) Blunt force trauma does not chemically contaminate tissues.

*Disadvantages*—(1) Manually applied blunt force trauma is displeasing for personnel who have to perform it. (2) Repeatedly performing manually applied blunt force trauma can result in personnel fatigue, loss of efficacy, and humane concerns. (3) Trauma to the cranium can damage tissues and interfere with diagnosis of brain diseases.

*General recommendations*—Replace, as much as possible, manually applied blunt force trauma to the head with alternate methods. Manually applied blunt force trauma is not acceptable for neonatal calves, because of their anatomic features.

### **M3.5 GUNSHOT**

A properly placed gunshot can cause immediate insensibility and a humane death. Under some conditions, a gunshot may be the only practical method of euthanasia. Shooting should only be performed by highly skilled personnel trained in the use of firearms and only in jurisdictions that allow for legal firearm use. The safety of personnel, the public, and other

animals that are nearby should be considered. The procedure should be performed outdoors and in areas where public access is restricted.

In applying gunshot to the head as a method of euthanasia for captive animals, the firearm should be aimed so that the projectile enters the brain, causing instant loss of consciousness.<sup>33,224,239–242</sup> This must take into account differences in brain position and skull conformation between species, as well as the energy requirement for penetration of the skull and sinus.<sup>221,240</sup> Accurate targeting for a gunshot to the head in various species has been described.<sup>240,241,243</sup> For wildlife and other freely roaming animals, the preferred target area should be the head. It may, however, not be possible or appropriate to target the head when killing is attempted from large distances (missed shots may result in jaw fractures or other nonfatal injuries) or when diagnostic samples of brain tissue are needed for diagnosis of diseases (eg, rabies, chronic wasting disease) important to public health. The appropriate firearm should be selected for the situation, with the goal being penetration and destruction of brain tissue without emergence from the contralateral side of the head.<sup>220,244</sup> A gunshot to the heart or neck does not immediately render animals unconscious, but may be required when it is not possible to meet the POE's definition of euthanasia.<sup>245</sup>

### **M3.5.1 BASIC PRINCIPLES OF FIREARMS**

To determine whether a firearm or type of ammunition is appropriate for euthanizing animals, some basic principles must be understood. The kinetic energy of an object increases as the speed and weight or mass of the object increase. In reference to firearms, the bullet's kinetic energy (muzzle energy) is the energy of a bullet as it leaves the end of the barrel when the firearm is discharged. Muzzle energy is frequently used as an indicator of a bullet's destructive potential. The heavier the bullet and the greater its velocity, the higher its muzzle energy and capacity for destruction of objects in its path.

Muzzle energy (E) can be expressed as the mass of the bullet (M) times its velocity (V) squared, divided by 2.<sup>246</sup> However, to accommodate units of measure commonly used in the United States for civilian firearms, energy (E) is expressed in foot-pounds. This is calculated by multiplying the bullet's weight (W) times its velocity in feet per second (V) squared and dividing the result by 450,450. The International System of Units expresses muzzle energy in joules (J).

The muzzle energy of commercially available ammunition varies greatly. For example, the difference in muzzle energy generated from a .357 Magnum handgun loaded with a 180 grain compared with a 110 grain bullet may differ by as much as 180 foot-pounds.<sup>246</sup> Velocity has an even greater impact on bullet energy than bullet mass. Selection of an appropriate bullet and firearm is critical to good performance when conducting euthanasia procedures. Lighter-weight, higher-velocity bullets can have high



muzzle energy, but decreased penetration, which can be an issue when penetrating thick bones.

Whereas most euthanasia using firearms is conducted at close range, calculations of muzzle energy are useful for determining which firearms are appropriate for euthanasia of animals of varying sizes. As the bullet travels beyond the muzzle of the firearm its energy gradually begins to decrease. While this is not a concern for the use of firearms in close proximity to the animal, when attempting to euthanize an animal from a distance, to ensure accuracy and that an acceptable level of muzzle energy is achieved, a high-powered rifle may be the better choice for conducting euthanasia. In all cases, the most important factors in ensuring successful euthanasia are the experience and skill of the shooter.

### **M3.5.2 MUZZLE ENERGY REQUIREMENTS**

For euthanasia, the combination of firearm and ammunition<sup>247</sup> selected must achieve a muzzle energy of at least 300 foot-lb (407 J) for animals weighing up to 400 lb (180 kg). For animals larger than 400 lb, 1,000 foot-lb (1,356 J) is required.<sup>220</sup> Handguns do not typically achieve the muzzle energy required to euthanize animals weighing more than 400 lb (180 kg), and therefore rifles must be used to euthanize these animals.

Some would argue that the muzzle energies recommended are well beyond what is necessary to achieve satisfactory results. Anecdotal comment suggests that the .22 LR is one of the most frequently used firearms for euthanasia of livestock with varying degrees of success. There is little doubt that success or failure is partially related to firearm and bullet characteristics, but probably more so to selection of the ideal anatomic site (ie, a site more likely to affect the brainstem) for conducting the procedure. The Humane Slaughter Association lists multiple firearms for euthanasia of livestock, including shotguns (12, 16, 20, 28, and .410 gauges), handguns (.32 to .45 caliber), and rifles (.22, .243, .270, and .308). In general, when comparing handguns with rifles, the longer the barrel, the higher the muzzle velocity. Therefore, if a .22 is used for euthanasia it is best fired from a rifle. The .22 should never be used on aged bulls, boars, or rams.<sup>248</sup>

### **M3.5.3 BULLET SELECTION**

While much of the emphasis in euthanasia by gunshot is placed on choice of the most appropriate firearm, it should be remembered that the gun is only the means of delivery. Bullet selection is quite possibly the most important consideration for euthanasia of livestock by gunshot. There are 3 basic types of bullets pertinent to this discussion: solid points, hollow points, and full metal jacket bullets. Solid-point bullets are preferred for euthanasia since they are designed for greater penetration of their targets. Under ideal conditions this type of bullet will also undergo moderate expansion to a mushroom shape

that increases its destructive characteristics. Hollow-point bullets are designed with a hollowed-out tip that causes rapid expansion and fragmentation of the bullet on impact. The hollow-point design allows maximum transfer of energy without risk of overpenetration. For applications where it may be desirable to control or reduce the degree of bullet penetration, hollow-point bullets are preferred. However, for the purposes of euthanasia of livestock the first requirement is that the bullet possesses sufficient energy to penetrate the skull and enter the underlying brain tissue. The concern with hollow-point bullets is that, since the majority of their energy is released on impact through fragmentation, they may not have sufficient energy to traverse the skull. The other extreme is represented by full metal jacket bullets, which do not expand or fragment on impact with their targets. These bullets have a lead core with a thin metal jacket cover that completely covers (surrounds) the bullet. Full metal jacket bullets generally achieve maximum penetration, which may have benefits for euthanasia but also creates additional safety hazards for bystanders. Shotguns loaded with shot shells (number 4, 5, or 6) have sufficient energy to traverse the skull but, unlike the possibility of bullets from either a handgun or rifle, rarely exit the skull. These are important considerations when selecting a firearm for on-farm euthanasia. Probably the most important point to be made relative to the use of gunshot for euthanasia is that scientific information on firearm and bullet selection is lacking. This is an area of urgent need in euthanasia research.

### **M3.5.4 FIREARM SAFETY**

Firearm safety cannot be overemphasized. Guns are inherently dangerous and must be handled with caution at all times. This needs to become the mindset in handling and use of firearms. Common recommendations include the following: 1) assume that all firearms are loaded, 2) always know where the muzzle is and never allow it to point in the direction of oneself or bystanders, 3) keep fingers away from the trigger and out of the trigger guard until ready to fire, 4) be sure of the target and what lies beyond it, and 5) always be sure that the gun is unloaded when not in use. Readers desiring more information or training on proper use of firearms are advised to contact local hunter safety programs. These programs offer training in firearm safety and also provide information on rules and regulations for firearm use.

Firearms should never be held flush to an animal's body. The pressure within the barrel when fired may cause the barrel of the gun to explode, placing the shooter and observers at great risk of injury. Ideally, the muzzle of the firearm should be held within 1 to 2 feet of the animal's forehead and perpendicular to the skull with the intended path of the bullet roughly in the direction of the foramen magnum. This will reduce the potential for ricochet while directing the bullet toward the cerebrum, midbrain, and medulla

oblongata, which will assure immediate loss of consciousness and rapid death.

*Advantages*—(1) Loss of consciousness is instantaneous if the projectile destroys most of the brain. (2) Given the need to minimize stress induced by handling and human contact, gunshot may be the most practical and logical method of euthanasia for wild or free-ranging species.

*Disadvantages*—(1) Gunshot may be dangerous for personnel. (2) It is aesthetically unpleasant for many. (3) Under field conditions, it may be difficult to hit the vital target area. (4) Brain tissue may not be able to be examined for evidence of brain diseases (eg, rabies infection, chronic wasting disease) when the head is targeted. (5) Skill in application of firearms and species-specific knowledge of appropriate target sites are required. In some states, firearm use is not permitted if the operator has been convicted of a felony.

*General recommendations*—When other methods cannot be used, an accurately delivered gunshot is acceptable with conditions for euthanasia.<sup>241,249</sup> When an animal can be appropriately restrained, the PCB, preferably one designed for euthanasia, is preferred to a gunshot because it is safer for personnel. Prior to shooting, animals accustomed to the presence of humans should be treated in a calm and reassuring manner to minimize anxiety. In the case of wild animals, gunshots should be delivered with the least amount of prior human contact necessary. Gunshot should not be used for routine euthanasia of animals in animal control situations, such as municipal pounds or shelters.

### M3.6 CERVICAL DISLOCATION

Cervical dislocation has been used for many years for euthanasia and, when performed by well-trained individuals on appropriate animals, appears to be humane. However, there are few scientific studies available to confirm this observation. The method has been used to euthanize small birds, poultry, mice, immature rats (< 200 g [7.1 oz]), and rabbits. For mice and rats, the thumb and index finger are placed on either side of the neck at the base of the skull or, alternatively, a rod is pressed at the base of the skull. With the other hand, the base of the tail or the hind limbs are quickly pulled, causing separation of the cervical vertebrae from the skull. For immature rabbits, the head is held in one hand and the hind limbs in the other. The animal is stretched and the neck is hyperextended and dorsally twisted to separate the first cervical vertebra from the skull.<sup>223,250</sup> For poultry and other birds, the legs of the bird should be grasped (or wings if grasped at the base) and the neck stretched by pulling on the head while applying a ventrodorsal rotational force to the skull. Crushing of cervical vertebrae and spinal cord is not acceptable unless the bird is first rendered unconscious. Personnel should be trained on anesthetized and/or dead animals to demonstrate proficiency.

Data suggest that electrical activity in the brain persists for 13 seconds following cervical dislocation in rats,<sup>251</sup> and unlike decapitation, rapid exsanguination does not contribute to loss of consciousness.<sup>252,253</sup> For some classes of poultry there is evidence that cervical dislocation may not cause immediate unconsciousness.<sup>235,236,254,255</sup>

*Advantages*—(1) Cervical dislocation is a method that may induce rapid loss of consciousness.<sup>150,251</sup> (2) It does not chemically contaminate tissue. (3) It is rapidly accomplished.

*Disadvantages*—(1) Cervical dislocation may be aesthetically displeasing to personnel performing or observing the method. (2) Cervical dislocation requires mastering technical skills to ensure loss of consciousness is rapidly induced. (3) Its use for euthanasia is limited to small birds, poultry, mice, immature rats (< 200 g), and rabbits.

*General recommendations*—Manual cervical dislocation is acceptable with conditions for euthanasia of small birds, poultry, mice, rats weighing < 200 g, and rabbits when performed by individuals with a demonstrated high degree of technical proficiency. In lieu of demonstrated technical competency, animals must be unconscious or anesthetized prior to cervical dislocation. For heavy rats and rabbits, the large muscle mass in the cervical region makes manual cervical dislocation physically more difficult.<sup>256</sup> When performed on poultry, cervical dislocation must result in luxation of the cervical vertebrae without primary crushing of the vertebrae and spinal cord. In some classes of poultry, there is evidence that cervical dislocation may not cause immediate unconsciousness.<sup>235,236,254,255</sup> In these cases, other physical methods such as blunt force trauma or decapitation may be more humane<sup>257</sup> and should be employed when available or practicable.

Those responsible for the use of this method must ensure that personnel performing cervical dislocation have been properly trained and consistently apply it humanely and effectively.

### M3.7 DECAPITATION

Decapitation can be used to euthanize rodents and small rabbits in research settings. It provides a means to recover tissues and body fluids that are chemically uncontaminated. It also provides a means of obtaining anatomically undamaged brain tissue for study.<sup>258</sup>

Although it has been demonstrated that electrical activity in the brain persists for 13 to 14 seconds following decapitation,<sup>259</sup> more recent studies and reports<sup>251–253</sup> indicate this activity does not imply that pain is perceived, and in fact conclude that loss of consciousness develops rapidly. Visually evoked potentials in mice were reduced more quickly after cervical dislocation compared with decapitation.<sup>260</sup>

Guillotines designed to accomplish decapitation of adult rodents and small rabbits in a uniformly instantaneous manner are commercially available. Guil-

lotines are not commercially available for neonatal rodents, but sharp blades can be used for this purpose.

**Advantages**—(1) Decapitation appears to induce rapid loss of consciousness.<sup>251-254</sup> (2) It does not chemically contaminate tissues. (3) It is rapidly accomplished.

**Disadvantages**—(1) Handling and restraint required to perform decapitation may be distressful for animals.<sup>261</sup> (2) The interpretation of the presence of electrical activity in the brain following decapitation has created controversy, and its importance may still be open to debate.<sup>251-254,259</sup> (3) Personnel performing this method should recognize the inherent danger of the guillotine and take precautions to prevent personal injury. (4) Decapitation may be aesthetically displeasing to personnel performing or observing the method.

**General recommendations**—This method is acceptable with conditions if performed correctly, and it may be used in research settings when its use is required by the experimental design and approved by the IACUC. Decapitation is justified for studies where undamaged and uncontaminated brain tissue is required. The equipment used to perform decapitation must be maintained in good working order and serviced on a regular basis to ensure sharpness of blades. The use of plastic cones to restrain animals appears to reduce distress from handling, minimizes the chance of injury to personnel, and improves positioning of the animal. Decapitation of amphibians, fish, and reptiles is addressed elsewhere in the Guidelines. Those responsible for the use of this method must ensure that personnel who perform decapitation have been properly trained to do so and are monitored for competence.

### M3.8 ELECTROCUTION

Alternating current has been used to euthanize dogs, cattle, sheep, goats, swine, chickens, foxes, mink, and fish.<sup>227,239,242,262-270</sup> Fifty- or 60-cycle electrical current is more effective than higher frequencies.<sup>271,272</sup> Electrocution induces death by cardiac fibrillation, which causes cerebral hypoxia.<sup>269,270,273</sup> However, animals do not lose consciousness for 10 to 30 seconds or more after onset of cardiac fibrillation. It is imperative that animals be unconscious and insensible to pain before being electrocuted. Unconsciousness can be induced by any method that is acceptable or acceptable with conditions, including passing a current through the brain.<sup>274</sup>

Parameters for use of electricity to induce unconsciousness are readily available.<sup>239,275</sup> When electricity is used to induce unconsciousness, a current is passed through the brain, which will induce a grand mal epileptic seizure.<sup>267,270,276,277</sup> Signs of effective induction of the seizure are extension of the limbs, opisthotonus, downward rotation of the eyeballs, and a tonic (rigid) spasm changing to a clonic (paddling) spasm with eventual muscle flaccidity.

There are 3 approaches to the use of electric-

ity for euthanasia. They are head only, 1-step head to body, and 2-step head and body. To be effective for euthanasia all 3 of these methods must induce a grand mal epileptic seizure.

For the head-only procedure, an electrical current is passed through the head to induce a seizure. This causes a temporary loss of consciousness of 15 to 30 seconds' duration,<sup>276-278</sup> but does not induce cardiac fibrillation. For this reason, head-only application must be immediately followed by a secondary procedure to cause death. When the head-only procedure is applied, the grand mal seizure is easily observable. Electrically induced cardiac fibrillation, exsanguination, or other appropriate adjunctive methods may be used to achieve death and should be performed within 15 seconds of when the animal becomes unconscious.

In the 1-step head-to-body approach an electrical current is simultaneously passed through both the brain and the heart. This simultaneously induces a grand mal seizure and electrocutes the animal by inducing cardiac arrest.<sup>263,276,279-281</sup> Because electricity passes through the spinal column, clinical signs of the grand mal seizure may be masked; however, it is usually possible to see a weak tonic phase and weak clonic phase after a 3-second application. If current is applied for more than 3 seconds, tonic and clonic spasms may be blocked. The 1-step approach must be used with amperage settings that have been scientifically verified to induce a seizure. Recommended amperages are 1.25 amps for pigs, 1 amp for sheep, and 1.25 amps for cattle.<sup>238,281</sup> Denicourt et al<sup>282</sup> report that 110 V at 60 Hz applied for 3 seconds was effective for pigs up to 125 kg (275 lb).

In the 2-step method an electrical current is passed through the head to induce unconsciousness, then a second current is passed through either the side of the body or the brisket to induce cardiac arrest.<sup>283,284</sup> Applying the second current by an electrode placed on the side of the body behind the forelimb has been reported to be effective.<sup>283</sup>

A common cause of failure to induce unconsciousness is incorrect placement of the electrodes.<sup>279</sup> Experiments with dogs revealed that electrode positions where the brain is bypassed do not cause instantaneous unconsciousness. When electricity passes only between the forelimbs and hind limbs or neck and feet, it causes the heart to fibrillate but does not induce sudden loss of consciousness.<sup>273</sup> The animal will be electrocuted, but will remain conscious until it dies from cardiac fibrillation.

Three options are available for correct electrode placement for the head-only method, including on both sides of the head between the eye and ear, the base of the ear on both sides of the head, and diagonally below one ear and above the eye on the opposite side of the head. For the 1-step (head-to-back) method, the head electrode may be placed on the forehead or immediately behind the ear. The head electrode should never be placed on the neck because the brain

will be bypassed.<sup>285</sup> Diagonal movement of the electrical current through the body can be accomplished by placing the head electrode behind one ear and the body electrode on the opposite side. When the 2-step procedure is used, placement of the body electrode behind the forelimb is effective.<sup>283</sup>

Electrodes consisting of a metal band or chain around the nose and a band or chain around the thorax appear to be effective for pigs weighing up to 125 kg.<sup>282</sup>

When electrical methods of euthanasia are used, the following signs of return to consciousness must be absent: rhythmic breathing, righting reflex, vocalization, eyeblink, and tracking of a moving object.<sup>283</sup> Gasping and nystagmus may be present in animals that have been successfully rendered unconscious with electricity. Gasping should not be confused with rhythmic breathing, and nystagmus (a rapid vibrating or fluttering of the eye) should not be confused with eyeblink (complete closure and then complete opening of the eye, which occurs without touching).

*Advantages*—(1) Electrocution is humane if the animal is first rendered unconscious. (2) It does not chemically contaminate tissues. (3) It is economical.

*Disadvantages*—(1) Electrocution may be hazardous to personnel. (2) It is not useful for dangerous, intractable animals that are difficult to restrain. (3) It is aesthetically objectionable because of violent extension and stiffening of the limbs, head, and neck. (4) It may not result in death in small animals (< 5 kg [11 lb]) because ventricular fibrillation and circulatory collapse do not always persist after cessation of current flow. (5) Sometimes it is not effective in dehydrated animals.<sup>275</sup> (6) Personnel must be familiar with appropriate placement of electrodes and use of equipment. (7) Purpose-built equipment must be used.

*General recommendations*—Euthanasia by electrocution is acceptable with conditions. It requires special skills and equipment that will ensure passage of sufficient current through the brain to induce loss of consciousness and induce tonic and clonic epileptic spasms. Unconsciousness must be induced before cardiac fibrillation or simultaneously with cardiac fibrillation. Cardiac fibrillation must never occur before the animal is rendered unconscious. Methods that apply electric current from head to tail, head to foot, or head to moistened metal plates on which the animal stands are unacceptable. The 2-step method should be used in situations where there may be questions about sufficient current to induce a grand mal seizure with tonic and clonic spasms. This approach enables observation of tonic and clonic spasms before a second current is applied to induce cardiac arrest. Although acceptable with conditions if the aforementioned requirements are met, the method's disadvantages outweigh its advantages in most applications. Electroimmobilization that paralyzes an animal without first inducing unconsciousness is extremely aversive and is unacceptable.<sup>274,275</sup> For both humane and

safety reasons, the use of household electrical cords is not acceptable.

### M3.9 KILL TRAPS

Mechanical kill traps are used for the collection and killing of small, free-ranging mammals for commercial purposes (fur, skin, or meat), scientific purposes, to stop property damage, and to protect human safety. Their use remains controversial and kill traps do not always render a rapid or stress-free death consistent with the criteria established for euthanasia by the POE.<sup>286</sup> For this reason, use of live traps followed by other methods of euthanasia is preferred. There are a few situations when that is not possible (eg, pest control) or when it may actually be more stressful for the animals or dangerous for humans to use live traps.

Although newer technologies are improving kill trap performance in achieving loss of consciousness quickly, individual testing is recommended to be sure the trap is working properly.<sup>287</sup> If kill traps must be used, the most humane option available must be chosen,<sup>288-290</sup> as evaluated by use of International Organization for Standardization testing procedures,<sup>291</sup> or by the methods of Gilbert,<sup>292</sup> Proulx et al,<sup>293,294</sup> or Hiltz and Roy.<sup>295</sup>

To reach the required level of efficacy, traps may need to be modified from manufacturers' production standards. In addition, as specified in scientific studies, trap placement (ground vs tree sets), bait type, set location, selectivity apparatus, body placement modifying devices (eg, sidewings, cones), trigger sensitivity, and trigger type, size, and conformation are essential considerations that could affect a kill trap's ability to reach these standards. Several kill traps, modifications, and set specifics have been scientifically evaluated and found to meet standards for various species.<sup>293,294,296-309,c</sup>

*Advantage*—(1) Free-ranging small mammals may be killed with minimal distress associated with handling and human contact. (2) Multiple animals may be effectively killed in situations where public health, animal behavior, or other constraints exist.

*Disadvantages*—(1) Traps may not kill within acceptable time periods. (2) Selectivity and efficiency is dependent on the skill and proficiency of the operator. (3) Nontarget species may be trapped and injured.

*General recommendations*—Kill traps do not consistently meet the POE's criteria for euthanasia, and may be best characterized as humane killing under some circumstances. At the same time, it is recognized they can be practical and effective for scientific animal collection or pest control when used in a manner that ensures selectivity, a swift kill, and no damage to body parts needed for field research.<sup>310,311</sup> Care must be taken to avoid trapping and injuring nontarget species.

Traps need to be checked at least once daily. In those instances when an animal is wounded or cap-

tured but not dead, the animal must be killed quickly and humanely. Kill traps should be used only when other acceptable methods are not practical or have failed. Traps for nocturnal species should not be activated during the day to avoid capture of diurnal species.<sup>310</sup> Trap manufacturers should strive to meet their responsibility of minimizing pain and suffering in target species. Traps that entrap a conscious animal in glue or other sticky substance are not acceptable for euthanasia, but may be required for pest control. Glue traps are acceptable for insects or spiders.

### **M3.10 MACERATION**

Maceration, via use of a specially designed mechanical apparatus having rotating blades or projections, causes immediate fragmentation and death of poultry up to 72 hours old and embryonated eggs. A review<sup>312</sup> of the use of commercially available macerators for euthanasia of chicks, poults, and pipped eggs indicates that death by maceration in poultry up to 72 hours old occurs immediately with minimal pain and distress. Maceration is an alternative to the use of CO<sub>2</sub> for euthanasia of poultry up to 72 hours old. Maceration is believed to be equivalent to cervical dislocation and cranial compression as to time element, and is considered to be an acceptable means of euthanasia for newly hatched poultry by the Federation of Animal Science Societies,<sup>313</sup> Agriculture Canada,<sup>314</sup> World Organization for Animal Health,<sup>239</sup> and European Union.<sup>315</sup>

*Advantages*—(1) Death is almost instantaneous. (2) The method is safe for workers. (3) Large numbers of animals can be killed quickly.

*Disadvantages*—(1) Special equipment is required and it must be kept in excellent working condition. (2) Personnel must be trained to ensure proper operation of equipment. (3) Macerated tissues may present biosecurity risks.

*General recommendations*—Maceration requires special equipment that must be kept in excellent working order. Chicks must be delivered to the macerator in a way and at a rate that prevents a backlog of chicks at the point of entry into the macerator and without causing injury, suffocation, or avoidable distress to the chicks before maceration.

### **M3.11 FOCUSED BEAM MICROWAVE IRRADIATION**

Heating by focused beam microwave irradiation is used primarily by neurobiologists to fix brain metabolites in vivo while maintaining the anatomic integrity of the brain.<sup>316</sup> Microwave instruments have been specifically designed for use in euthanasia of laboratory mice and rats. The instruments differ in design from kitchen units and may vary in maximal power output from 1.3 to 10 kW. All units direct their microwave energy to the head of the animal. The power required to rapidly halt brain enzyme activity depends on the efficiency of the unit, the ability to tune the resonant cavity, and the size of the rodent

head.<sup>317</sup> There is considerable variation among instruments in the time required for loss of consciousness and euthanasia. A 10-kW, 2,450-MHz instrument operated at a power of 9 kW will increase the brain temperature of 18- to 28-g (0.6- to 1.0-oz) mice to 79°C in 330 milliseconds, and the brain temperature of 250- to 420-g (8.8- to 14.8-oz) rats to 94°C in 800 milliseconds.<sup>318</sup>

*Advantages*—(1) Loss of consciousness is achieved in < 100 milliseconds, and death in < 1 second. (2) This is the most effective method to fix brain tissue in vivo for subsequent assay of enzymatically labile chemicals.

*Disadvantages*—(1) Instruments are expensive. (2) Only animals the size of mice and rats can be euthanized with commercial instruments that are currently available.

*General recommendations*—Focused beam microwave irradiation is a humane method for euthanizing small laboratory rodents if instruments that induce rapid loss of consciousness are used. Only instruments that are designed for this use and have appropriate power and microwave distribution can be used. Microwave ovens designed for domestic and institutional kitchens are unacceptable for euthanasia.

### **M3.12 THORACIC (CARDIOPULMONARY, CARDIAC) COMPRESSION**

Thoracic (cardiopulmonary, cardiac) compression is a method that has been used by biologists to terminate the lives of wild small mammals and birds, mainly under field conditions.<sup>319</sup> Although it has been used extensively in the field, data supporting this method are limited, including degree of distress induced and time to unconsciousness or death.<sup>320</sup> Given our current knowledge of the physiology of both small mammals and birds, it cannot be assured that thoracic compression does not result in pain and distress before animals become unconscious. Consequently, thoracic compression is an unacceptable means of euthanizing animals that are not deeply anesthetized or insentient due to other reasons, but is appropriate as a secondary method for animals that are insentient.

The consensus of veterinarians with field biology training and expertise is that portable equipment and alternate methods are currently available to field biologists for euthanasia of wildlife under field conditions, in accordance with current standards for good animal welfare. Anesthetics can be administered prior to application of thoracic compression. Depending on taxa, open-drop methods or injectable agents that do not require DEA registration can be used. These alternate methods are generally practical to use with minimal training and preparation as standard procedures prior to embarking upon fieldwork.

## M3.13 ADJUNCTIVE METHODS

### M3.13.1 EXSANGUINATION

Exsanguination can be used to ensure death subsequent to stunning, or in otherwise unconscious animals. Because anxiety is associated with extreme hypovolemia, exsanguination must not be used as a sole means of euthanasia.<sup>321</sup> Animals may be exsanguinated to obtain blood products, but only when they are sedated, stunned, or anesthetized.<sup>322</sup>

### M3.13.2 PITHING

In general, pithing is used as an adjunctive procedure to ensure death in an animal that has been rendered unconscious by other means. For some species, such as frogs, with anatomic features that facilitate easy access to the CNS, pithing may be used as a sole means of euthanasia, but an anesthetic overdose is more suitable.

Pithing in ruminants is performed by inserting a pithing rod or tool through the entry site produced in the skull by a PCB or free bullet.<sup>323</sup> The operator manipulates the pithing tool to substantially destroy both brainstem and spinal cord tissue. Muscular activity during pithing can be considerable, but is followed by quiescence that facilitates exsanguination or other procedures. Pithing is sometimes used in advance of exsanguination to reduce involuntary movement in stunned animals.<sup>324</sup> This method should not be used in ruminants intended for food because of possible contamination of the meat with specified risk materials.

Disposable pithing rods are available for purchase. The rod must be somewhat rigid, yet flexible, and of sufficient length to reach the brain and spinal column through the access point in the skull.

## M4 Footnotes

- a. MS 222, Argent Laboratories Inc, Redmond, Wash.
- b. T-61, Intervet Canada Corp, Kirkland, QC, Canada.
- c. Twitchell C, Roy LD, Gilbert FF, et al. Effectiveness of rotating-jaw killing traps for beaver (*Castor Canadensis*) (oral presentation). North Am Aquat Furbearer Symp, Starkville, Miss, May 1999.

## M5 References

1. Alkire MT. General anesthesia. In: Banks WP, ed. *Encyclopedia of consciousness*. San Diego: Elsevier/Academic Press, 2009;296-313.
2. Sharp J, Azar T, Lawson D. Comparison of carbon dioxide, argon, and nitrogen for inducing unconsciousness or euthanasia of rats. *J Am Assoc Lab Anim Sci* 2006;45:21-25.
3. Christensen L, Barton Gade P. Danish Meat Research Institute. Transportation and pre-stun handling: CO<sub>2</sub>-systems. Available at: [www.butina.eu/fileadmin/user\\_upload/images/articles/transport.pdf](http://www.butina.eu/fileadmin/user_upload/images/articles/transport.pdf). Accessed Dec 13, 2010.
4. Interagency Research Animal Committee. US government principles for the utilization and care of vertebrate animals used in testing, research and training. Available at: [grants.nih.gov/grants/olaw/references/phspol.htm#USGovPrinciples](http://grants.nih.gov/grants/olaw/references/phspol.htm#USGovPrinciples). Accessed Dec 13, 2010.
5. Chorney JM, Kain ZN. Behavioral analysis of children's response to induction of anesthesia. *Anesth Analg* 2009;109:1434-1440.

6. Przybylo HJ, Tarbell SE, Stevenson GW. Mask fear in children presenting for anesthesia: aversion, phobia, or both? *Paediatr Anaesth* 2005;15:366-370.
7. Hawkins P, Playle L, Gollledge H, et al. *Newcastle consensus meeting on carbon dioxide euthanasia of laboratory animals*. London: National Centre for the Replacement, Refinement and Reduction of Animals in Science, 2006. Available at: [www.nc3rs.org.uk/downloaddoc.asp?id=416&page=292&skin=0](http://www.nc3rs.org.uk/downloaddoc.asp?id=416&page=292&skin=0). Accessed Jan 20, 2011.
8. Glass HG, Snyder FF, Webster E. The rate of decline in resistance to anoxia of rabbits, dogs, and guinea pigs from the onset of viability to adult life. *Am J Physiol* 1944;140:609-615.
9. Powell K, Ethun K, Taylor DK. The effect of light level, CO<sub>2</sub> flow rate, and anesthesia on the stress response of mice during CO<sub>2</sub> euthanasia. *Lab Anim (NY)* 2016;45:386-395.
10. Garnett N. PHS policy on humane care and use of laboratory animals clarification regarding use of carbon dioxide for euthanasia of small laboratory animals. Release date: July 17, 2002. Available at: [grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html). Accessed Dec 14, 2010.
11. Meyer RE, Morrow WEM. Carbon dioxide for emergency on-farm euthanasia of swine. *J Swine Health Prod* 2005;13:210-217.
12. Meyer RE. Principles of carbon dioxide displacement. *Lab Anim (NY)* 2008;37:241-242.
13. Nunn JF. *Nunn's applied respiratory physiology*. 4th ed. Oxford, England: Butterworth-Heinemann, 1993;583-593.
14. Davis PD, Kenny GNC. *Basic physics and measurement in anaesthesia*. 5th ed. Edinburgh: Butterworth-Heinemann, 2003;57-58.
15. Hornett TD, Haynes AP. Comparison of carbon dioxide/air mixture and nitrogen/air mixture for the euthanasia of rodents: design of a system for inhalation euthanasia. *Anim Technol* 1984;35:93-99.
16. Smith W, Harrap SB. Behavioural and cardiovascular responses of rats to euthanasia using carbon dioxide gas. *Lab Anim* 1997;31:337-346.
17. Niel L, Weary DM. Behavioural responses of rats to gradual-fill carbon dioxide euthanasia and reduced oxygen concentrations. *Appl Anim Behav Sci* 2006;100:295-308.
18. Booth NH. Inhalant anesthetics. In: Booth NH, McDonald LE, eds. *Veterinary pharmacology and therapeutics*. 6th ed. Ames, Iowa: Iowa State University Press, 1988;181-211.
19. Flecknell PA, Roughan JV, Hedenqvist P. Induction of anaesthesia with sevoflurane and isoflurane in the rabbit. *Lab Anim* 1999;33:41-46.
20. Voss LJ, Sleight JW, Barnard JP, et al. The howling cortex: seizures and general anesthetic drugs. *Anesth Analg* 2008;107:1689-1703.
21. Knigge U, Sør-Jensen P, Jørgensen H, et al. Stress-induced release of anterior pituitary hormones: effect of H<sub>3</sub> receptor-mediated inhibition of histaminergic activity or posterior hypothalamic lesion. *Neuroendocrinology* 1999;69:44-53.
22. Tinnikov AA. Responses of serum corticosterone and corticosteroid-binding globulin to acute and prolonged stress in the rat. *Endocrine* 1999;11:145-150.
23. Zelena D, Kiem DT, Barna I, et al. Alpha-2-adrenoreceptor subtypes regulate ACTH and beta-endorphin secretions during stress in the rat. *Psychoneuroendocrinology* 1999;24:333-343.
24. van Herck H, Baumans V, de Boer SF, et al. Endocrine stress response in rats subjected to singular orbital puncture while under diethyl-ether anesthesia. *Lab Anim* 1991;25:325-329.
25. Leach MC, Howell VA, Allan TF, et al. Aversion to gaseous euthanasia agents in rats and mice. *Comp Med* 2002;52:249-257.
26. Leach MC, Howell VA, Allan TF, et al. Degrees of aversion shown by rats and mice to different concentrations of inhalational anaesthetics. *Vet Rec* 2002;150:808-815.
27. Leach MC, Howell VA, Allan TF, et al. Measurement of aversion to determine humane methods of anaesthesia and euthanasia. *Anim Welf* 2004;13:577-586.
28. Makowska LJ, Weary DM. Rat aversion to induction with inhaled anaesthetics. *Appl Anim Behav Sci* 2009;119:229-235.

29. Moody CM, Chua B, Weary DM. The effect of carbon dioxide flow rate on the euthanasia of laboratory mice. *Lab Anim* 2014;48:298–304.
30. Wong D, Makowska IJ, Weary DM. Rat aversion to isoflurane versus carbon dioxide. *Biol Lett* 2012;9:20121000.
31. Bertolus JB, Nemeth G, Makowska IJ, et al. Rat aversion to sevoflurane and isoflurane. *Appl Anim Behav Sci* 2015;164:73–80.
32. Hawkins P, Prescott MJ, Carbone L, et al. A good death? Report of the Second Newcastle Meeting on Laboratory Animal Euthanasia. *Animals (Basel)* 2016;6:50.
33. Universities Federation for Animal Welfare. *Humane killing of animals*. 4th ed. South Mimms, Potters Bar, England: Universities Federation for Animal Welfare, 1988;16–22.
34. Makowska IJ, Vickers L, Mancell J, et al. Evaluating methods of gas euthanasia for laboratory mice. *Appl Anim Behav Sci* 2009;121:230–235.
35. Schmid RD, Hodgson DS, McMurphy RM. Comparison of anesthetic induction in cats by use of isoflurane in an anesthetic chamber with a conventional vapor or liquid injection technique. *J Am Vet Med Assoc* 2008;233:262–266.
36. Steffey EP, Mama KR. Inhalation anesthetics. In: Tranquilli WJ, Thurmon JC, Grimm KA, eds. *Lumb and Jones' veterinary anesthesia and analgesia*. 4th ed. Ames, Iowa: Blackwell, 2007;355–393.
37. Thomas AA, Flecknell PA, Golledge HDR. Combining nitrous oxide with carbon dioxide decreases the time to loss of consciousness during euthanasia in mice—refinement of animal welfare? *PLoS One* 2012;7:e32290.
38. Smith RK, Rault JL, Gates RS, et al. A two-step process of nitrous oxide before carbon dioxide for humanely euthanizing piglets: on-farm trials. *Animals (Basel)* 2018;8:52.
39. Occupational Safety and Health Administration. Anesthetic gases: guidelines for workplace exposures. Available at: [www.osha.gov/dts/osta/anestheticgases/index.html#A](http://www.osha.gov/dts/osta/anestheticgases/index.html#A). Accessed Dec 5, 2010.
40. Lockwood G. Theoretical context-sensitive elimination times for inhalational anaesthetics. *Br J Anaesth* 2010;104:648–655.
41. Seymour TL, Nagamine CM. Evaluation of isoflurane overdose for euthanasia of neonatal mice. *J Am Assoc Lab Anim Sci* 2016;55:321–323.
42. Haldane J. The action of carbonic oxide in man. *J Physiol* 1895;18:430–462.
43. Raub JA, Mathieu-Nolf M, Hampson NB, et al. Carbon monoxide poisoning—a public health perspective. *Toxicology* 2000;145:1–14.
44. Hampson NB, Weaver LK. Carbon monoxide poisoning: a new incidence for an old disease. *Undersea Hyperb Med* 2007;34:163–168.
45. Lowe-Ponsford FL, Henry JA. Clinical aspects of carbon monoxide poisoning. *Adverse Drug React Acute Poisoning Rev* 1989;8:217–240.
46. Bloom JD. Some considerations in establishing divers' breathing gas purity standards for carbon monoxide. *Aerosp Med* 1972;43:633–636.
47. Norman CA, Halton DM. Is carbon monoxide a workplace teratogen? A review and evaluation of the literature. *Ann Occup Hyg* 1990;34:335–347.
48. Wojtczak-Jaroszowa J, Kbow S. Carbon monoxide, carbon disulfide, lead and cadmium—four examples of occupational toxic agents linked to cardiovascular disease. *Med Hypotheses* 1989;30:141–150.
49. Fechter LD. Neurotoxicity of prenatal carbon monoxide exposure. *Res Rep Health Eff Inst* 1987;12:3–22.
50. Ramsey TL, Eilmann HJ. Carbon monoxide acute and chronic poisoning and experimental studies. *J Lab Clin Med* 1932;17:415–427.
51. Enggaard Hansen N, Creutzberg A, Simonsen HB. Euthanasia of mink (*Mustela vison*) by means of carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO) and nitrogen (N<sub>2</sub>). *Br Vet J* 1991;147:140–146.
52. Vinte FJ. *The humane killing of mink*. London: Universities Federation for Animal Welfare, 1957.
53. Chalifoux A, Dallaire A. Physiologic and behavioral evaluation of CO euthanasia of adult dogs. *Am J Vet Res* 1983;44:2412–2417.
54. Dallaire A, Chalifoux A. Premedication of dogs with acepromazine or pentazocine before euthanasia with carbon monoxide. *Can J Comp Med* 1985;49:171–178.
55. Weary DM, Makowska IJ. Rat aversion to carbon monoxide. *Appl Anim Behav Sci* 2009;121:148–151.
56. Simonsen HB, Thordal-Christensen AA, Ockens N. Carbon monoxide and carbon dioxide euthanasia of cats: duration and animal behavior. *Br Vet J* 1981;137:274–278.
57. Lambooy E, Spanjaard W. Euthanasia of young pigs with carbon monoxide. *Vet Rec* 1980;107:59–61.
58. Gerritzen MA, Lambooy E, Stegeman JA, et al. Slaughter of poultry during the epidemic of avian influenza in the Netherlands in 2003. *Vet Rec* 2006;159:39–42.
59. Herin RA, Hall P, Fitch JW. Nitrogen inhalation as a method of euthanasia in dogs. *Am J Vet Res* 1978;39:989–991.
60. Noell WK, Chinn HI. Time course of failure of the visual pathway in rabbits during anoxia. *Fed Proc* 1949;8:1–19.
61. Altland PD, Brubach HF, Parker MG. Effects of inert gases on tolerance of rats to hypoxia. *J Appl Physiol* 1968;24:778–781.
62. Arieli R. Can the rat detect hypoxia in inspired air? *Respir Physiol* 1990;79:243–253.
63. Niel L, Weary DM. Rats avoid exposure to carbon dioxide and argon. *Appl Anim Behav Sci* 2007;107:100–109.
64. Makowska IJ, Niel L, Kirkden RD, et al. Rats show aversion to argon-induced hypoxia. *Appl Anim Behav Sci* 2008;114:572–581.
65. Burkholder TH, Niel L, Weed JL, et al. Comparison of carbon dioxide and argon euthanasia: effects on behavior, heart rate, and respiratory lesions in rats. *J Am Assoc Lab Anim Sci* 2010;49:448–453.
66. Raj ABM. Aversive reactions to argon, carbon dioxide and a mixture of carbon dioxide and argon. *Vet Rec* 1996;138:592–593.
67. Webster AB, Fletcher DL. Assessment of the aversion of hens to different gas atmospheres using an approach-avoidance test. *Appl Anim Behav Sci* 2004;88:275–287.
68. Raj ABM, Gregory NG, Wotton SB. Changes in the somatosensory evoked potentials and spontaneous electroencephalogram of hens during stunning in argon-induced anoxia. *Br Vet J* 1991;147:322–330.
69. Raj M, Gregory NG. Time to loss of somatosensory evoked potentials and onset of changes in the spontaneous electroencephalogram of turkeys during gas stunning. *Vet Rec* 1993;133:318–320.
70. Mohan Raj AB, Gregory NG, Wotton SB. Effect of carbon dioxide stunning on somatosensory evoked potentials in hens. *Res Vet Sci* 1990;49:355–359.
71. Raj ABM, Whittington PE. Euthanasia of day-old chicks with carbon dioxide and argon. *Vet Rec* 1995;136:292–294.
72. Gerritzen MA, Lambooy E, Hillebrand SJW, et al. Behavioral responses of broilers to different gaseous atmospheres. *Poult Sci* 2000;79:928–933.
73. McKeegan DEF, McIntyre J, Demmers TGM, et al. Behavioural responses of broiler chickens during acute exposure to gaseous stimulation. *Appl Anim Behav Sci* 2006;99:271–286.
74. Webster AB, Fletcher DL. Reactions of laying hens and broilers to different gases used for stunning poultry. *Poult Sci* 2001;80:1371–1377.
75. Lambooy E, Gerritzen MA, Engel B, et al. Behavioural responses during exposure of broiler chickens to different gas mixtures. *Appl Anim Behav Sci* 1999;62:255–265.
76. Raj ABM, Gregory NG. Welfare implications of the gas stunning of pigs: 1. Determination of aversion to the initial inhalation of carbon dioxide or argon. *Anim Welf* 1995;4:273–280.
77. Dalmau A, Llonch P, Rodriguez P, et al. Stunning pigs with different gas mixtures: gas stability. *Anim Welf* 2010;19:315–323.
78. Raj AB. Behaviour of pigs exposed to mixtures of gases and

- the time required to stun and kill them: welfare implications. *Vet Rec* 1999;144:165-168.
79. Raj M, Mason G. Reaction of farmed mink (*Mustela vison*) to argon-induced hypoxia. *Vet Rec* 1999;145:736-737.
  80. Dalmau A, Rodriguez P, Llonch P, et al. Stunning pigs with different gas mixtures: aversion in pigs. *Anim Welf* 2010;19:325-333.
  81. Martoft L, Lomholt L, Kolthoff C, et al. Effects of CO<sub>2</sub> anaesthesia on central nervous system activity in swine. *Lab Anim* 2002;36:115-126.
  82. Raj AB, Johnson SP, Wotton SB, et al. Welfare implications of gas stunning pigs: 3. the time to loss of somatosensory evoked potentials and spontaneous electrocorticogram of pigs during exposure to gases. *Vet J* 1997;153:329-339.
  83. Ring C, Erhardt W, Kraft H, et al. CO<sub>2</sub> anaesthesia of slaughter pigs. *Fleischwirtschaft (Frankf)* 1988;68:1304-1307.
  84. Forslid A. Transient neocortical, hippocampal, and amygdaloid EEG silence induced by one minute inhalation of high CO<sub>2</sub> concentration in swine. *Acta Physiol Scand* 1987;130:1-10.
  85. Mattsson JL, Stinson JM, Clark CS. Electroencephalographic power-spectral changes coincident with onset of carbon dioxide narcosis in rhesus monkey. *Am J Vet Res* 1972;33:2043-2049.
  86. Woodbury DM, Rollins LT, Gardner MD, et al. Effects of carbon dioxide on brain excitability and electrolytes. *Am J Physiol* 1958;192:79-90.
  87. Leake CD, Waters RM. The anesthetic properties of carbon dioxide. *Curr Res Anesth Anal* 1929;8:17-19.
  88. Chen X, Gallar J, Pozo MA, et al. CO<sub>2</sub> stimulation of the cornea—a comparison between human sensation and nerve activity in polymodal nociceptive afferents of the cat. *Eur J Neurosci* 1995;7:1154-1163.
  89. Peppel P, Anton F. Responses of rat medullary dorsal horn neurons following intranasal noxious chemical stimulation—effects of stimulus intensity, duration and interstimulus interval. *J Neurophysiol* 1993;70:2260-2275.
  90. Thürauf N, Hummel T, Kettenmann B, et al. Nociceptive and reflexive responses recorded from the human nasal mucosa. *Brain Res* 1993;629:293-299.
  91. Anton F, Peppel P, Euchner I, et al. Noxious chemical stimulation—responses of rat trigeminal brain stem neurons to CO<sub>2</sub> pulses applied to the nasal mucosa. *Neurosci Lett* 1991;123:208-211.
  92. Feng Y, Simpson TL. Nociceptive sensation and sensitivity evoked from human cornea and conjunctiva stimulated by CO<sub>2</sub>. *Invest Ophthalmol Vis Sci* 2003;44:529-532.
  93. Thürauf N, Günther M, Pauli E, et al. Sensitivity of the negative mucosal potential to the trigeminal target stimulus CO<sub>2</sub>. *Brain Res* 2002;942:79-86.
  94. Danneman PJ, Stein S, Walshaw SO. Humane and practical implications of using carbon dioxide mixed with oxygen for anesthesia or euthanasia of rats. *Lab Anim Sci* 1997;47:376-385.
  95. Widdicombe JG. Reflexes from the upper respiratory tract. In: Cherniak NS, Widdicombe JG, eds. *Handbook of physiology: the respiratory system*. Bethesda, Md: American Physiological Society, 1986;363-394.
  96. Yavari P, McCulloch PF, Panneton WM. Trigeminally-mediated alteration of cardiorespiratory rhythms during nasal application of carbon dioxide in the rat. *J Auton Nerv Syst* 1996;61:195-200.
  97. Chisholm JM, Pang DS. Assessment of carbon dioxide, carbon dioxide/oxygen, isoflurane and pentobarbital killing methods in adult female Sprague-Dawley rats. *PLoS One* 2016;11:e0162639.
  98. Moosavi SH, Golestanian E, Binks AP, et al. Hypoxic and hypercapnic drives to breathe generate equivalent levels of air hunger in humans. *J Appl Physiol* 2003;94:141-154.
  99. Millar RA. Plasma adrenaline and noradrenaline during diffusion respiration. *J Physiol* 1960;150:79-90.
  100. Nahas GG, Ligou JC, Mehlman B. Effects of pH changes on O<sub>2</sub> uptake and plasma catecholamine levels in the dog. *Am J Physiol* 1960;198:60-66.
  101. Liotti M, Brannan S, Egan G, et al. Brain responses associated with consciousness of breathlessness (air hunger). *Proc Natl Acad Sci USA* 2001;98:2035-2040.
  102. Dripps RD, Comroe JH. The respiratory and circulatory response of normal man to inhalation of 7.6 percent CO<sub>2</sub> and 10.4 percent CO<sub>2</sub> with a comparison of the maximal ventilation produced by severe muscular exercise, inhalation of CO<sub>2</sub> and maximal voluntary hyperventilation. *Am J Physiol* 1947;149:43-51.
  103. Hill L, Flack M. The effect of excess of carbon dioxide and of want of oxygen upon the respiration and the circulation. *J Physiol* 1908;37:77-111.
  104. Banzett RB, Lansing RW, Evans KC, et al. Stimulus-response characteristics of CO<sub>2</sub>-induced air hunger in normal subjects. *Respir Physiol* 1996;103:19-31.
  105. Shea SA, Harty HR, Banzett RB. Self-control of level of mechanical ventilation to minimize CO<sub>2</sub>-induced air hunger. *Respir Physiol* 1996;103:113-125.
  106. Fowler WS. Breaking point of breath-holding. *J Appl Physiol* 1954;6:539-545.
  107. Kirkden RD, Niel L, Stewart SA, et al. Gas killing of rats: the effect of supplemental oxygen on aversion to carbon dioxide. *Anim Welf* 2008;17:79-87.
  108. Coenen AM, Drinkenburg WH, Hoenderken R, et al. Carbon dioxide euthanasia in rats: oxygen supplementation minimizes signs of agitation and asphyxia. *Lab Anim* 1995;29:262-268.
  109. Hewett TA, Kovacs MS, Artwohl JE, et al. A comparison of euthanasia methods in rats, using carbon dioxide in pre-filled and fixed flow-rate filled chambers. *Lab Anim Sci* 1993;43:579-582.
  110. Borovsky V, Herman M, Dunphy G, et al. CO<sub>2</sub> asphyxia increases plasma norepinephrine in rats via sympathetic nerves. *Am J Physiol* 1998;274:R19-R22.
  111. Reed B, Varon J, Chait BT, et al. Carbon dioxide-induced anesthesia result in a rapid increase in plasma levels of vasopressin. *Endocrinology* 2009;150:2934-2939.
  112. Raff H, Roarty TP. Renin, ACTH, and aldosterone during acute hypercapnia and hypoxia in conscious rats. *Am J Physiol* 1988;254:R431-R435.
  113. Marotta SF, Sithichoke N, Garcy AM, et al. Adrenocortical responses of rats to acute hypoxic and hypercapnic stresses after treatment with aminergic agents. *Neuroendocrinology* 1976;20:182-192.
  114. Raff H, Shinsako J, Keil LC, et al. Vasopressin, ACTH, and corticosteroids during hypercapnia and graded hypoxia in dogs. *Am J Physiol* 1983;244:E453-E458.
  115. Argyropoulos SV, Bailey JE, Hood SD, et al. Inhalation of 35% CO<sub>2</sub> results in activation of the HPA axis in healthy volunteers. *Psychoneuroendocrinology* 2002;27:715-729.
  116. Herman JP, Cullinan WE. Neurocircuitry of stress: central control of the hypothalamo-pituitary-adrenocortical axis. *Trends Neurosci* 1997;20:78-84.
  117. Kc P, Haxhiu MA, Trouth CO, et al. CO<sub>2</sub>-induced c-Fos expression in hypothalamic vasopressin containing neurons. *Respir Physiol* 2002;129:289-296.
  118. Hackbarth H, Kuppers N, Bohnet W. Euthanasia of rats with carbon dioxide—animal welfare aspects. *Lab Anim* 2000;34:91-96.
  119. Blackshaw JK, Fenwick DC, Beattie AW, et al. The behavior of chickens, mice and rats during euthanasia with chloroform, carbon dioxide and ether. *Lab Anim* 1988;22:67-75.
  120. Britt DP. The humaneness of carbon dioxide as an agent of euthanasia for laboratory rodents. In: *Euthanasia of unwanted, injured or diseased animals or for educational or scientific purposes*. Potters Bar, England: Universities Federation for Animal Welfare, 1987;19-31.
  121. Raj ABM, Gregory NG. Welfare implications of the gas stunning of pigs: 2. Stress of induction of anaesthesia. *Anim Welf* 1996;5:71-78.
  122. Jongman EC, Barnett JL, Hemsworth PH. The aversiveness of carbon dioxide stunning in pigs and a comparison of the CO<sub>2</sub> stunner crate vs the V-restrainer. *Appl Anim Behav Sci* 2000;67:67-76.



123. Troeger K, Woltersdorf W. Gas anesthesia of slaughter pigs. I. Stunning experiments under laboratory conditions with fat pigs of known halothane reaction type—meat quality, animal protection. *Fleischwirtschaft (Frankf)* 1991;72:1063–1068.
124. Dodman NH. Observations on use of Wernberg dip-lift carbon dioxide apparatus for pre-slaughter anesthesia of pigs. *Br Vet J* 1977;133:71–80.
125. Gerritzen MA, Lambooi J, Reimert HG, et al. Susceptibility of duck and turkey to severe hypercapnic hypoxia. *Poult Sci* 2006;85:1055–1061.
126. Gerritzen M, Lambooi B, Reimert H, et al. A note on behaviour of poultry exposed to increasing carbon dioxide concentrations. *Appl Anim Behav Sci* 2007;108:179–185.
127. McKeegan DEF, McIntyre JA, Demmers TGM, et al. Physiological and behavioural responses of broilers to controlled atmosphere stunning: implications for welfare. *Anim Welf* 2007;16:409–426.
128. Abeyesinghe SM, McKeegan DEF, McLeman MA, et al. Controlled atmosphere stunning of broiler chickens. I. Effects on behaviour, physiology and meat quality in a pilot scale system at a processing plant. *Br Poult Sci* 2007;48:406–423.
129. Cooper J, Mason G, Raj M. Determination of the aversion of farmed mink (*Mustela vison*) to carbon dioxide. *Vet Rec* 1998;143:359–361.
130. Withrock IC. The use of carbon dioxide (CO<sub>2</sub>) as an alternative euthanasia method for goat kids. Available at: search.proquest.com/docview/1733971790/abstract/C0605E819B-D543A6PQ/1. Accessed Nov 11, 2019.
131. Battaglia M, Ogliairi A, Harris J, et al. A genetic study of the acute anxious response to carbon dioxide stimulation in man. *J Psychiatr Res* 2007;41:906–917.
132. Nardi AE, Freire RC, Zin WA. Panic disorder and control of breathing. *Respir Physiol Neurobiol* 2009;167:133–143.
133. Grandin T. Effect of genetics on handling and CO<sub>2</sub> stunning of pigs (updated July 2008). *Meat Focus Int* 1992;July:124–126. Available at: www.grandin.com/humane/meatfocus7-92.html. Accessed Dec 13, 2010.
134. Ziemann AE, Allen JE, Dahdaleh NS, et al. The amygdala is a chemosensor that detects carbon dioxide and acidosis to elicit fear behavior. *Cell* 2009;139:1012–1021.
135. Kohler I, Moens Y, Busato A, et al. Inhalation anaesthesia for the castration of piglets: CO<sub>2</sub> compared to halothane. *Zentralbl Veterinarmed A* 1998;45:625–633.
136. Boivin GP, Bottomley MA, Dudley ES, et al. Physiological, behavioral, and histological responses of male C57BL/6N mice to different CO<sub>2</sub> chamber replacement rates. *J Am Assoc Lab Anim Sci* 2016;55:451–461.
137. Glen JB, Scott WN. Carbon dioxide euthanasia of cats. *Br Vet J* 1973;129:471–479.
138. Franson JC. Euthanasia. In: Friend M, Franson JC, eds. *Field manual of wildlife diseases. General field procedures and diseases of birds*. Biological Resources Division information and technology report 1999-001. Washington, DC: US Department of the Interior and US Geological Survey, 1999;49–53.
139. Mohan Raj AB, Gregory NG. Effect of rate of induction of carbon dioxide anaesthesia on the time of onset of unconsciousness and convulsions. *Res Vet Sci* 1990;49:360–363.
140. Mohan Raj AB, Wotton SB, Gregory NG. Changes in the somatosensory evoked potentials and spontaneous electroencephalogram of hens during stunning with a carbon dioxide and argon mixture. *Br Vet J* 1992;148:147–156.
141. Raj M, Gregory NG. An evaluation of humane gas stunning methods for turkeys. *Vet Rec* 1994;135:222–223.
142. Walsh JL, Percival A, Turner PV. Efficacy of blunt force trauma, a novel mechanical cervical dislocation device, and a non-penetrating captive bolt device for on-farm euthanasia of pre-weaned kits, growers, and adult commercial meat rabbits. *Animals (Basel)* 2017;7:100.
143. Dalmau AJ, Palliser C, Pedernera I, et al. Use of high concentrations of carbon dioxide for stunning rabbits reared for meat production. *World Rabbit Sci* 2016;24:25–37.
144. Poole GH, Fletcher DL. A comparison of argon, carbon dioxide, and nitrogen in a broiler killing system. *Poult Sci* 1995;74:1218–1223.
145. Latimer KS, Rakich PM. Necropsy examination. In: Ritchie BW, Harrison GJ, Harrison LR, eds. *Avian medicine: principles and application*. Lake Worth, Fla: Wingers Publishing Inc, 1994;355–379.
146. Jaksch W. Euthanasia of day-old male chicks in the poultry industry. *Int J Study Anim Probl* 1981;2:203–213.
147. Pritchett-Corning KR. Euthanasia of neonatal rats with carbon dioxide. *J Am Assoc Lab Anim Sci* 2009;48:23–27.
148. Pritchett K, Corrow D, Stockwell J, et al. Euthanasia of neonatal mice with carbon dioxide. *Comp Med* 2005;55:275–281.
149. Hayward JS, Lissou PA. Carbon dioxide tolerance of rabbits and its relation to burrow fumigation. *Aust Wildl Res* 1978;5:253–261.
150. Iwarsson K, Reh binder C. A study of different euthanasia techniques in guinea pigs, rats, and mice. Animal response and postmortem findings. *Scand J Lab Anim Sci* 1993;20:191–205.
151. Valentine H, Williams WO, Maurer KJ. Sedation or inhalant anesthesia before euthanasia with CO<sub>2</sub> does not reduce behavioral or physiologic signs of pain and stress in mice. *J Am Assoc Lab Anim Sci* 2012;51:50–57.
152. US FDA. Animal drug compounding. Available at: www.fda.gov/animal-veterinary/unapproved-animal-drugs/animal-drug-compounding. Accessed Jan 13, 2020.
153. Campbell VL, Butler AL, Lunn KF. Use of a point-of-care urine drug test in a dog to assist in diagnosing barbiturate toxicosis secondary to ingestion of a euthanized carcass. *J Vet Emerg Crit Care San Antonio* 2009;19:286–291.
154. Jurczynski K, Zittlau E. Pentobarbital poisoning in Sumatran tigers (*Panthera tigris sumatrae*). *J Zoo Wildl Med* 2007;38:583–584.
155. O'Rourke K. Euthanized animals can poison wildlife: veterinarians receive fines. *J Am Vet Med Assoc* 2002;220:146–147.
156. US FDA. 21 CFR Part 522. Injectable or implantable dosage form new animal drugs; euthanasia solution; technical amendment. *Fed Regist* 2003;68:42968–42969.
157. Wilkins III JR, Bowman ME. Needlestick injuries among female veterinarians: frequency, syringe contents and side-effects. *Occup Med (Lond)* 1997;47:451–457.
158. Lewbart GA, ed. *Invertebrate medicine*. Oxford, England: Blackwell, 2006.
159. Schwartz JA, Warren RJ, Henderson DW, et al. Captive and field tests of a method for immobilization and euthanasia of urban deer. *Wildl Soc Bull* 1997;25:532–541.
160. Bucher K, Bucher KE, Waltz D. Irritant actions of unphysiological pH values. A controlled procedure to test for topical irritancy. *Agents Actions* 1979;9:124–132.
161. Khoo SY, Lay BPP, Joya J, et al. Local anaesthetic refinement of pentobarbital euthanasia reduces abdominal writhing without affecting immunohistochemical endpoints in rats. *Lab Anim* 2018;52:152–162.
162. Grier RL, Schaffer CB. Evaluation of intraperitoneal and intrahepatic administration of a euthanasia agent in animal shelter cats. *J Am Vet Med Assoc* 1990;197:1611–1615.
163. Schoell AR, Heyde BR, Weir DE, et al. Euthanasia method for mice in rapid time-course pulmonary pharmacokinetic studies. *J Am Assoc Lab Anim Sci* 2009;48:506–511.
164. Philbeck TE, Miller LJ, Montez D, et al. Hurts so good. Easing IO pain and pressure. *JEMS* 2010;35:58–62, 65–66, 68, 69.
165. Montez D, Miller LJ, Puga T, et al. Pain management with the use of IO: easing IO pain and pressure. Available at: www.jems.com/article/intraosseous/pain-management-use-io. Accessed Jun 13, 2011.
166. US FDA. *Tributame euthanasia solution: embutramide/chloroquine phosphate/lidocaine*. Freedom of Information summary. NADA 141-245. Silver Spring, Md: FDA, 2005.
167. US FDA. 21 CFR Part 522. Implantation or injectable dosage form new animal drugs; embutramide, chloroquine, and lidocaine solution. *Fed Regist* 2005;70:36336–36337.

168. US FDA. 21 CFR Part 1308. Schedules of controlled substances: placement of etomidate into schedule III. *Fed Regist* 2006;71:51115-51117.
169. Sodfola OA. The cardiovascular effect of chloroquine in anesthetized dogs. *Can J Physiol Pharmacol* 1980;58:836-841.
170. Don Michael TA, Alwassadeh S. The effects of acute chloroquine poisoning with special references to the heart. *Am Heart J* 1970;79:831-842.
171. Webb AI. Euthanizing agents. In: Reviere JE, Papich MG, eds. *Veterinary pharmacology and therapeutics*. 9th ed. Ames, Iowa: Wiley Blackwell, 2009;401-408.
172. Webb AI, Pablo LS. Local anesthetics. In: Reviere JE, Papich MG, eds. *Veterinary pharmacology and therapeutics*. 9th ed. Ames, Iowa: Wiley Blackwell, 2009;381-400.
173. Hellebrekers LJ, Baumans V, Bertens APMG, et al. On the use of T61 for euthanasia of domestic and laboratory animals; an ethical evaluation. *Lab Anim* 1990;24:200-204.
174. Park CK, Kim K, Jung SJ, et al. Molecular mechanism for local anesthetic action of eugenol in the rat trigeminal system. *Pain* 2009;144:84-94.
175. Kearns KS, Swenson B, Ramsay EC. Dosage trials with transmucosal carfentanil citrate in non-human primates. *Zoo Biol* 1999;18:397-402.
176. Flecknell PA. *Laboratory animal anaesthesia*. 2nd ed. San Diego: Elsevier Academic Press, 1996;168-171.
177. Saxena K. Death from potassium chloride overdose. *Postgrad Med* 1988;84:97-98, 101-102.
178. Lumb WV. Euthanasia by noninhalant pharmacologic agents. *J Am Vet Med Assoc* 1974;165:851-852.
179. Ciganovich E. Barbiturates. In: *Field manual of wildlife diseases. General field procedures and diseases of birds*. Biological Resources Division information and technology report 1999-001. Washington, DC: US Department of the Interior and US Geological Survey, 1999;349-351.
180. Raghav R, Taylor M, Guincho M, et al. Potassium chloride as a euthanasia agent in psittacine birds: clinical aspects and consequences for histopathologic assessment. *Can Vet J* 2011;52:303-306.
181. Messenger JB, Nixon M, Ryan KP. Magnesium chloride as an anaesthetic for cephalopods. *Comp Biochem Physiol C* 1985;82:203-205.
182. Luckl J, Keating J, Greenberg JH. Alpha-chloralose is a suitable anesthetic for chronic focal cerebral ischemia studies in the rat: a comparative study. *Brain Res* 2008;1191:157-167.
183. Belant JL, Tyson LA, Seamans TW. Use of alpha-chloralose by the Wildlife Services program to capture nuisance birds. *Wildl Soc Bull* 1999;27:938-942.
184. Cobaugh DJ. Ethanol. In: Brent J, Phillips SD, Wallace KL, et al, eds. *Critical care toxicology*. Philadelphia: Mosby, 2005;1553-1558.
185. Harms C. Anesthesia in fish. In: Fowler ME, Miller RE, eds. *Zoo and wild animal medicine: current therapy 4*. Philadelphia: WB Saunders Co, 1999;158-163.
186. Lord R. Use of ethanol for euthanasia of mice. *Aust Vet J* 1989;66:268.
187. Allen-Worthington KH, Brice AK, Marx JO, et al. Intraperitoneal injection of ethanol for the euthanasia of laboratory mice (*Mus musculus*) and rats (*Rattus norvegicus*). *J Am Assoc Lab Anim Sci* 2015;54:769-778.
188. de Souza Dyer C, Brice AK, Marx JO. Intraperitoneal administration of ethanol as a means of euthanasia for neonatal mice (*Mus musculus*). *J Am Assoc Lab Anim Sci* 2017;56:299-306.
189. US FDA. ANADA 200-226 Tricaine-S—original approval. Available at: [www.fda.gov/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/FOIADrugSummaries/ucm132992.htm](http://www.fda.gov/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/FOIADrugSummaries/ucm132992.htm). Accessed May 16, 2011.
190. Noga EJ. Pharmacopoeia. In: *Fish disease: diagnosis and treatment*. 2nd ed. Ames, Iowa: Wiley-Blackwell, 2010;375-420.
191. Stoskopf MK. Anesthesia. In: Brown LA, ed. *Aquaculture for veterinarians: fish husbandry and medicine*. Oxford, England: Pergamon Press, 1993;161-167.
192. Committee for Veterinary Medicinal Products. *Tricaine mesilate: summary report*. EMEA/MRL/586/99-FINAL. London: European Agency for the Evaluation of Medicinal Products, 1999. Available at [www.ema.europa.eu/docs/en\\_GB/document\\_library/Maximum\\_Residue\\_Limits\\_-Report/2009/11/WC500015660.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Maximum_Residue_Limits_-Report/2009/11/WC500015660.pdf). Accessed Sep 9, 2010.
193. Torreilles SL, McClure DE, Green SL. Evaluation and refinement of euthanasia methods for *Xenopus laevis*. *J Am Assoc Lab Anim Sci* 2009;48:512-516.
194. Bernstein PS, Digre KB, Creel DJ. Retinal toxicity associated with occupational exposure to the fish anesthetic MS 222 (ethyl-m-aminobenzoic acid methanesulfonate). *Am J Ophthalmol* 1997;124:843-844.
195. Kaiser H, Green DM. Keeping the frogs still: Orajel is a safe anesthetic in amphibian photography. *Herpetol Rev* 2001;32:93-94.
196. Chen MH, Combs CA. An alternative anesthesia for amphibians: ventral application of benzocaine. *Herpetol Rev* 1999;30:34.
197. Blessing JJ, Marshal JC, Balcombe SR. Humane killing of fishes for scientific research: a comparison of two methods. *J Fish Biol* 2010;76:2571-2577.
198. US FDA Center for Veterinary Medicine. *Enforcement priorities for drug use in aquaculture*. Silver Spring, Md: US FDA, 2011. Available at: [www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/PoliciesProceduresManual/UCM046931.pdf](http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/PoliciesProceduresManual/UCM046931.pdf). Accessed Jan 10, 2011.
199. National Toxicology Program. *NTP technical report on the toxicology and carcinogenesis studies of isoeugenol (CAS No. 97-54-1) in F344/N rats and B6C3F1 mice (gavage studies)*. NTP TR 551. NIH publication No. 08-5892. Washington, DC: US Department of Health and Human Services, 2008. Available at: [ntp.niehs.nih.gov/files/TR551board\\_web.pdf](http://ntp.niehs.nih.gov/files/TR551board_web.pdf). Accessed May 16, 2011.
200. Grush J, Noakes DL, Moccia RD. The efficacy of clove oil as an anesthetic for the zebrafish, *Danio rerio* (Hamilton). *Zebrafish* 2004;1:46-53.
201. Borski RJ, Hodson RG. Fish research and the institutional animal care and use committee. *ILAR J* 2003;44:286-294.
202. Sladky KK, Swanson CR, Stoskopf MK, et al. Comparative efficacy of tricaine methanesulfonate and clove oil for use as anesthetics in red pacu (*Piaractus brachipomus*). *Am J Vet Res* 2001;62:337-342.
203. Brodin P, Roed A. Effects of eugenol on rat phrenic nerve and phrenic-diaphragm preparations. *Arch Oral Biol* 1984;29:611-615.
204. Ingvast-Larsson JC, Axén VC, Kiessling AK. Effects of isoeugenol on in vitro neuromuscular blockade of rat phrenic nerve-diaphragm preparations. *Am J Vet Res* 2003;64:690-693.
205. Meyer RE, Fish R. Pharmacology of injectable anesthetics, sedatives, and tranquilizers. In: Fish RE, Danneman PJ, Brown M, et al, eds. *Anesthesia and analgesia of laboratory animals*. 2nd ed. San Diego: Academic Press, 2008;27-82.
206. Neiffer DL, Stamper A. Fish sedation, anesthesia, analgesia, and euthanasia: considerations, methods, and types of drugs. *ILAR J* 2009;50:343-360.
207. US FDA. The index of legally marketed unapproved new animal drugs for minor species. Available at: [www.fda.gov/animal-veterinary/minor-use/minor-species/index-legally-marketed-unapproved-new-animal-drugs-minor-species](http://www.fda.gov/animal-veterinary/minor-use/minor-species/index-legally-marketed-unapproved-new-animal-drugs-minor-species). Accessed Dec 27, 2019.
208. Estrela C, Estrela CR, Barbin EL, et al. Mechanism of action of sodium hypochlorite. *Braz Dent J* 2002;13:113-117.
209. National Institutes of Health. *Guidelines for use of zebrafish in the NIH intramural research program*. Bethesda, Md: National Institutes of Health, 2009. Available at: [oacu.od.nih.gov/arac/documents/Zebrafish.pdf](http://oacu.od.nih.gov/arac/documents/Zebrafish.pdf). Accessed Nov 25, 2010.
210. Agency for Toxic Substances and Disease Registry. Toxicological profile for formaldehyde. July 1999. Available at: [www.atsdr.cdc.gov/toxprofiles/tp111.pdf](http://www.atsdr.cdc.gov/toxprofiles/tp111.pdf). Accessed Aug 13, 2012.
211. National Toxicology Program. *Report on carcinogens*. 12th ed. Research Triangle Park, NC: US Department of Health

- and Human Services, Public Health Service, National Toxicology Program, 2011.
212. Murray MJ. Invertebrates. In: *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;25–27.
  213. Vickroy TW. Local anesthetics. In: Riviere JE, Papich MG, eds. *Veterinary pharmacology and therapeutics*. 10th ed. Hoboken, NJ: Wiley Blackwell, 2018;369–386.
  214. Aleman M, Davis E, Kynch H, et al. Drug residues after intravenous anesthesia and intrathecal lidocaine hydrochloride euthanasia in horses. *J Vet Intern Med* 2016;30:1322–1326.
  215. Dennis MB, Jr., Dong WK, Weisbrod KA, et al. Use of captive bolt as a method of euthanasia in larger laboratory animal species. *Lab Anim Sci* 1988;38:459–462.
  216. Gibson TJ, Whitehead C, Taylor R, et al. Pathophysiology of penetrating captive bolt stunning in Alpacas (*Vicugna pacos*). *Meat Sci* 2015;100:227–231.
  217. Schwenk BK, Lechner I, Ross SG, et al. Magnetic resonance imaging and computer tomography of brain lesions in water buffaloes and cattle stunned with handguns or captive bolts. *Meat Sci* 2016;113:35–40.
  218. Gilliam JN, Shearer JK, Bahr RJ, et al. Evaluation of brainstem disruption following penetrating captive-bolt shot in isolated cattle heads: comparison of traditional and alternative shot-placement landmarks. *Anim Welf* 2016;25:347–353.
  219. Kline HC, Wagner DR, Edwards-Callaway LN, et al. Effect of captive bolt gun length on brain trauma and post-stunning hind limb activity in finished cattle *Bos taurus*. *Meat Sci* 2019;155:69–73.
  220. Woods J, Shearer JK, Hill J. Recommended on-farm euthanasia practices. In: Grandin T, ed. *Improving animal welfare: a practical approach*. Wallingford, England: CABI Publishing, 2010.
  221. Blackmore DK. Energy requirements for the penetration of heads of domestic stock and the development of a multiple projectile. *Vet Rec* 1985;116:36–40.
  222. Daly CC, Whittington PE. Investigation into the principal determinants of effective captive bolt stunning of sheep. *Res Vet Sci* 1989;46:406–408.
  223. Clifford DH. Preanesthesia, anesthesia, analgesia, and euthanasia. In: Fox JG, Cohen BJ, Loew FM, eds. *Laboratory animal medicine*. New York: Academic Press Inc, 1984;528–563.
  224. Australian Veterinary Association. *Guidelines for humane slaughter and euthanasia. Member's directory and policy compendium*. Lisarow, NSW: Veritage Press, 1997.
  225. Finnie JW. Neuropathologic changes produced by non-penetrating percussive captive bolt stunning of cattle. *N Z Vet J* 1995;43:183–185.
  226. Blackmore DK, Newhook JC. The assessment of insensibility in sheep, calves and pigs during slaughter. In: Eikelenboom G, ed. *Stunning of animals for slaughter*. Boston: Martinus Nijhoff Publishers, 1983;13–25.
  227. Gregory NG. Animal welfare at markets and during transport and slaughter. *Meat Sci* 2008;80:2–11.
  228. Grandin T. Objective scoring of animal handling and stunning practices at slaughter plants. *J Am Vet Med Assoc* 1998;212:36–39.
  229. Gibson TJ, Mason CW, Spence JY, et al. Factors affecting penetrating captive bolt gun performance. *J Appl Anim Welf Sci* 2015;18:222–238.
  230. Terlouw C, Bourguet C, Deiss V. Consciousness, unconsciousness and death in the context of slaughter. Part 1. Neurobiological mechanisms underlying stunning and killing. *Meat Sci* 2016;118:133–146.
  231. Terlouw C, Bourguet C, Deiss V. Consciousness, unconsciousness and death in the context of slaughter. Part 2. Evaluation methods. *Meat Sci* 2016;118:147–156.
  232. Oliveira SEO, Gregory NG, Dalla Costa FA, et al. Effectiveness of pneumatically powered penetrating and non-penetrating captive bolts in stunning cattle. *Meat Sci* 2018;140:9–13.
  233. Gibson TJ, Oliveira SEO, Dalla Costa FA, et al. Electroencephalographic assessment of pneumatically powered penetrating and non-penetrating captive-bolt stunning of bulls. *Meat Sci* 2019;151:54–59.
  234. Casey-Trott TM, Millman ST, Turner PV, et al. Effectiveness of a nonpenetrating captive bolt for euthanasia of 3 kg to 9 kg pigs. *J Anim Sci* 2014;92:5166–5174.
  235. Erasmus MA, Turner PV, Niekamp SG, et al. Brain and skull lesions resulting from use of percussive bolt, cervical dislocation by stretching, cervical dislocation by crushing and blunt trauma in turkeys. *Vet Rec* 2010;167:850–858.
  236. Erasmus MA, Turner PV, Widowski TM. Measures of insensibility used to determine effective stunning and killing of poultry. *J Appl Poult Res* 2010;19:288–298.
  237. Canadian Council on Animal Care. *Guide to the care and use of experimental animals*. Vol 1. 2nd ed. Ottawa: Canadian Council on Animal Care, 1993.
  238. Green CJ. Euthanasia. In: *Animal anesthesia*. London: Laboratory Animals Ltd, 1979;237–241.
  239. World Organisation for Animal Health (OIE). Chapter 7.6: killing of animals for disease control purposes. In: *Terrestrial animal health code*. 20th ed. Paris: OIE, 2011. Available at: [www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_1.7.6.htm](http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.6.htm). Accessed May 16, 2011.
  240. Finnie JW. Neuroradiological aspects of experimental traumatic missile injury in sheep. *N Z Vet J* 1994;42:54–57.
  241. Longair JA, Finley GG, Laniel MA, et al. Guidelines for the euthanasia of domestic animals by firearms. *Can Vet J* 1991;32:724–726.
  242. Carding T. Euthanasia of dogs and cats. *Anim Regul Stud* 1977;1:5–21.
  243. Blackmore DK, Bowling MC, Madie P, et al. The use of a shotgun for the emergency slaughter or euthanasia of large mature pigs. *N Z Vet J* 1995;43:134–137.
  244. Finnie IW. Traumatic head injury in ruminant livestock. *Aust Vet J* 1997;75:204–208.
  245. Blackmore DK, Madie P, Bowling MC, et al. The use of a shotgun for emergency slaughter of stranded cetaceans. *N Z Vet J* 1995;43:158–159.
  246. Nelson JM. Bullet energy in foot pounds. Available at: [web.stcloudstate.edu/jmnelson/web/gun/benergy/index.html](http://web.stcloudstate.edu/jmnelson/web/gun/benergy/index.html). Accessed Jun 15, 2011.
  247. Baker HJ, Scrimgeour HJ. Evaluation of methods for the euthanasia of cattle in a foreign animal disease outbreak. *Can Vet J* 1995;36:160–165.
  248. Humane Slaughter Association. *Humane killing of livestock using firearms: guidance notes #3*. 2nd ed. Wheathampstead, England: Humane Slaughter Association, 2005.
  249. National Pork Board, American Association of Swine Practitioners. *On-farm euthanasia of swine*. 2nd edition. Des Moines, Iowa: National Pork Board, 2009.
  250. Hughes HC. Euthanasia of laboratory animals. In: Melby EC, Altman NH, eds. *Handbook of laboratory animal science*. Vol 3. Cleveland: CRC Press, 1976;553–559.
  251. Vanderwolf CH, Buzak DP, Cain RK, et al. Neocortical and hippocampal electrical activity following decapitation in the rat. *Brain Res* 1988;451:340–344.
  252. Holson RR. Euthanasia by decapitation: evidence that this technique produces prompt, painless unconsciousness in laboratory rodents. *Neurotoxicol Teratol* 1992;14:253–257.
  253. Derr RF. Pain perception in decapitated rat brain. *Life Sci* 1991;49:1399–1402.
  254. Gregory NG, Wotton SB. Comparison of neck dislocation and percussion of the head on visual evoked responses in the chicken's brain. *Vet Rec* 1990;126:570–572.
  255. Erasmus MA, Lawlis P, Duncan IJ, et al. Using time to insensibility and estimated time of death to evaluate a nonpenetrating captive bolt, cervical dislocation, and blunt trauma for on-farm killing of turkeys. *Poult Sci* 2010;89:1345–1354.
  256. Keller GL. Physical euthanasia methods. *Lab Anim (NY)* 1982;11:20–26.
  257. Webster AB, Fletcher DL, Savage SI. Humane on-farm killing of spent hens. *J Appl Poult Res* 1996;5:191–200.
  258. Feldman DB, Gupta BN. Histopathologic changes in labora-

- tory animals resulting from various methods of euthanasia. *Lab Anim Sci* 1976;26:218–221.
259. Mikeska JA, Klemm WR. EEG evaluation of humaneness of asphyxia and decapitation euthanasia of the laboratory rat. *Lab Anim Sci* 1975;25:175–179.
  260. Cartner SC, Barlow SC, Ness TJ. Loss of cortical function in mice after decapitation, cervical dislocation, potassium chloride injection, and CO<sub>2</sub> inhalation. *Comp Med* 2007;57:570–573.
  261. Urbanski HF, Kelley ST. Sedation by exposure to gaseous carbon dioxide-oxygen mixture: application to studies involving small laboratory animal species. *Lab Anim Sci* 1991;41:80–82.
  262. Gregory NG, Wotton SB. Effect of slaughter on the spontaneous and evoked activity of the brain. *Br Poult Sci* 1986;27:195–205.
  263. Anil MH, McKinstry JL. Reflexes and loss of sensibility following head-to-back electrical stunning in sheep. *Vet Rec* 1991;128:106–107.
  264. Hatch RC. Euthanizing agents. In: Booth NH, McDonald LE, eds. *Veterinary pharmacology and therapeutics*. 6th ed. Ames, Iowa: Iowa State University Press, 1988;1143–1148.
  265. Lambooy E, van Voorst N. Electrocution of pigs with notifiable diseases. *Vet Q* 1986;8:80–82.
  266. Eikelenboom G, ed. *Stunning of animals for slaughter*. Boston: Martinus Nijhoff Publishers, 1983.
  267. Warrington R. Electrical stunning, a review of the literature. *Vet Bull* 1974;44:617–628.
  268. Roberts TDM. Electrocution cabinets. *Vet Rec* 1974;95:241–242.
  269. Loftsgard G, Rraathen S, Helgebostad A. Electrical stunning of mink. *Vet Rec* 1972;91:132–134.
  270. Croft PG, Hume CW. Electric stunning of sheep. *Vet Rec* 1956;68:318–321.
  271. Anil MH, McKinstry JL. The effectiveness of high frequency electrical stunning in pigs. *Meat Sci* 1992;31:481–491.
  272. Croft PS. Problems with electric stunning. *Vet Rec* 1952;64:255–258.
  273. Roberts TDM. Cortical activity in electrocuted dogs. *Vet Rec* 1954;66:561–567.
  274. Pascoe PJ. Humaneness of an electroimmobilization unit for cattle. *Am J Vet Res* 1986;47:2252–2256.
  275. Grandin T, American Meat Institute Animal Welfare Committee. *Recommended animal handling guidelines and audit guide: a systematic approach to animal welfare*. Washington, DC: American Meat Institute, 2010;19–22.
  276. Grandin T. Euthanasia and slaughter of livestock. *J Am Vet Med Assoc* 1994;204:1354–1360.
  277. Lambooy E. Electrical stunning of sheep. *Meat Sci* 1982;6:123–135.
  278. Blackmore DK, Newhook JC. Insensibility during slaughter of pigs in comparison to other domestic stock. *N Z Vet J* 1981;29:219–222.
  279. Grandin T. Solving return-to-sensibility problems after electrical stunning in commercial pork slaughter plants. *J Am Vet Med Assoc* 2001;219:608–611.
  280. Anil MH. Studies on the return of physical reflexes in pigs following electrical stunning. *Meat Sci* 1991;30:13–21.
  281. Hoenderken R. Electrical and carbon dioxide stunning of pigs for slaughter. In: Eikelenboom G, ed. *Stunning of animals for slaughter*. Boston: Martinus Nijhoff Publishers, 1983;59–63.
  282. Denicourt M, Klopfenstein C, DuFour V, et al. *Developing a safe and acceptable method for on-farm euthanasia of pigs by electrocution. Final report*. Montreal: Faculty of Veterinary Medicine, University of Montreal, 2009.
  283. Vogel KD, Badtram G, Claus JR, et al. Head-only followed by cardiac arrest electrical stunning is an effective alternative to head-only electrical stunning in pigs. *J Anim Sci* 2011;89:1412–1418.
  284. Weaver AL, Wotton SB. The Jarvis Beef Stunner: effect of a prototype chest electrode. *Meat Sci* 2009;81:51–56.
  285. Grandin T. Cattle vocalizations are associated with handling and equipment problems in slaughter plants. *Appl Anim Behav Sci* 2001;71:191–201.
  286. Meerburg BGH, Brom FWA, Kijlstra A. The ethics of rodent control. *Pest Manag Sci* 2008;64:1205–1211.
  287. Federal Provincial Committee for Humane Trapping. *Final report: Committee of the Federal Provincial Wildlife Conference*. Ottawa: Canadian Wildlife Service, 1981.
  288. Department of Foreign Affairs and International Trade. *Agreement on international humane trapping standards between the European Community, Canada, and the Russian Federation*. Ottawa: Department of Foreign Affairs and International Trade, 1997;1–32.
  289. Canadian General Standards Board. *Animal (mammal) traps—mechanically powered, trigger-activated killing traps for use on land*. No. CAN/CGSB-144.1-96. Ottawa: Canadian General Standards Board, 1996;1–36.
  290. Nolan JW, Barrett MW. *Description and operation of the humane trapping research facility at the Alberta Environmental Centre*. AECV90-R3. Vegreville, AB, Canada: Alberta Environmental Centre, 1990.
  291. International Organization for Standardization. *Animal (mammal) traps-part 4: methods for testing killing trap systems used on land or underwater*. TC 191, ISO/DIS 19009-4E. Geneva: International Organization for Standardization, 2000;1–15.
  292. Gilbert FF. Assessment of furbearer response to trapping devices, in *Proceedings*. Worldw Furbearer Conf 1981;1599–1611.
  293. Proulx G, Barrett MW. Evaluation of the Bionic trap to quickly kill fisher (*Martes pennanti*) in simulated natural environments. *J Wildl Dis* 1993;29:310–316.
  294. Proulx G, Barrett MW, Cook SR. The C120 Magnum with pan trigger: a humane trap for mink (*Mustela vison*). *J Wildl Dis* 1990;26:511–517.
  295. Hiltz M, Roy LD. Rating of killing traps against humane trapping standards using computer simulations, in *Proceedings*. 19th Vertebr Pest Conf 2000;197–201.
  296. Association of Fish and Wildlife Agencies. Best management practices. Available at: [jfcdev.com/~fishwild/?section=best\\_management\\_practices](http://jfcdev.com/~fishwild/?section=best_management_practices) Accessed Jul 22, 2012.
  297. International Association of Fish and Wildlife Agencies. *Summary of progress. 1999-2000 field season: testing restraining and body-gripping traps for development of best management practices for trapping in the United States*. Washington, DC: International Association of Fish and Wildlife Agencies, 2003.
  298. Warburton B, Gregory NG, Morriss G. Effect of jaw shape in kill-traps on time to loss of palpebral reflexes in brushtail possums. *J Wildl Dis* 2000;36:92–96.
  299. King CM. The effects of two types of steel traps upon captured stoats (*Mustela erminea*). *J Zool (Lond)* 1981;195:553–554.
  300. Proulx G, Kolenosky AJ, Cole PJ, et al. A humane killing trap for lynx (*Felis lynx*): the Conibear 330 with clamping bars. *J Wildl Dis* 1995;31:57–61.
  301. Warburton B, Hall JV. Impact momentum and clamping force thresholds for developing standards for possum kill traps. *NZ J Zool* 1995;22:39–44.
  302. Naylor BJ, Novak M. Catch efficiency and selectivity of various traps and sets used for capturing American martens. *Wildl Soc Bull* 1994;22:489–496.
  303. Proulx G, Barrett MW. Field testing of the C120 magnum trap for mink. *Wildl Soc Bull* 1993;21:421–426.
  304. Proulx G, Kolenosky AJ, Badry MJ, et al. Assessment of the Savageau 2001-8 trap to effectively kill arctic fox. *Wildl Soc Bull* 1993;21:132–135.
  305. Proulx G, Kolenosky AJ, Cole PJ. Assessment of the Kania trap to humanely kill red squirrels (*Tamiasciurus hudsonicus*) in enclosures. *J Wildl Dis* 1993;29:324–329.
  306. Proulx G, Pawlina IM, Wong RK. Re-evaluation of the C120 magnum and Bionic traps to humanely kill mink (lett). *J Wildl Dis* 1993;29:184.
  307. Cooper JE, Ewbank R, Platt C, et al. *Euthanasia of amphib-*

- ians and reptiles*. London: Universities Federation for Animal Welfare and World Society for the Protection of Animals, 1989.
308. Proulx G, Cook SR, Barrett MW. Assessment and preliminary development of the rotating jaw Conibear 120 trap to effectively kill marten (*Martes americana*). *Can J Zool* 1989;67:1074–1079.
  309. Hill EP. *Evaluation of improved traps and trapping techniques*. Project report W-44-6, Job IV-B. Montgomery, Ala: Alabama Department of Conservation and Natural Resources, 1981;1-19.
  310. Sikes RS, Gannon WL, Animal Care and Use Committee of the American Society of Mammalogists. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. *J Mammal* 2011;92:235-253.
  311. *Improving animal welfare in US trapping programs*. Washington, DC: International Association of Fish and Wildlife Agencies, 1997.
  312. American Association of Avian Pathologists (AAAP) Animal Welfare and Management Practices Committee. *Review of mechanical euthanasia of day-old poultry*. Athens, Ga: American Association of Avian Pathologists, 2005.
  313. Federation of Animal Science Societies (FASS). *Guide for the care and use of agricultural animals in agricultural research and teaching*. Champaign, Ill: Federation of Animal Science Societies, 2010.
  314. Agriculture Canada. *Recommended code of practice for the care and handling of poultry from hatchery to processing plant*. Publication 1757/E.1989. Ottawa: Agriculture Canada, 1989.
  315. European Council. *European Council Regulation No. 1099/2009 of 24 December 2009 on the protection of animals at the time of killing*. Brussels: The Council of the European Union, 2009.
  316. Stavinoha WR. Study of brain neurochemistry utilizing rapid inactivation of brain enzyme activity by heating and microwave irradiation. In: Black CL, Stavinoha WB, Marvyama Y, eds. *Microwave irradiation as a tool to study labile metabolites in tissue*. Elmsford, NY: Pergamon Press, 1983;1-12.
  317. Stavinoha WB, Frazer J, Modak AT. Microwave fixation for the study of acetylcholine metabolism. In: Jenden DJ, ed. *Cholinergic mechanisms and psychopharmacology*. New York: Plenum Publishing Corp, 1978;169-179.
  318. Ikarashi Y, Marvyama Y, Stavinoha WB. Study of the use of the microwave magnetic field for the rapid inactivation of brain enzymes. *Jpn J Pharmacol* 1984;35:371-387.
  319. Engilis A Jr, Engilis IE, Paul-Murphy J. Rapid cardiac compression: an effective method of avian euthanasia. *Condor* 2018;120:617-621.
  320. Paul-Murphy JR, Engilis, Jr. A, Pascoe PJ, et al. Comparison of intrasosseous pentobarbital administration and thoracic compression for euthanasia of anesthetized sparrows (*Passer domesticus*) and starlings (*Sturnus vulgaris*). *Am J Vet Res* 2017;78:887-899.
  321. Blackmore DK. Differences in behavior between sheep and cattle during slaughter. *Res Vet Sci* 1984;37:223-226.
  322. Gregory NG, Wotton SB. Time to loss of brain responsiveness following exsanguination in calves. *Res Vet Sci* 1984;37:141-143.
  323. Appelt M, Sperry J. Stunning and killing cattle humanely and reliably in emergency situations—a comparison between a stunning-only and stunning and pithing protocol. *Can Vet J* 2007;48:529-534.
  324. Leach TM, Wilkins LJ. Observations on the physiological effects of pithing cattle at slaughter. *Meat Sci* 1985;15:101-106.

# Part III—Methods of Euthanasia by Species and Environment

## SI Companion Animals

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method can be met.

### SI.1 GENERAL CONSIDERATIONS

Companion animals for which euthanasia is determined to be necessary are usually encountered in 4 main environments: individually owned animals; breeding animals (from dams, sires, and single litters to colonies of breeding animals); populations of animals maintained in animal control facilities, shelters and rescues, and pet shops; and animals maintained in research laboratories. Examples of less common venues in which companion animals might be euthanized include quarantine stations and Greyhound racetracks. Aquatic companion animals are considered in Section S6, Fish and Aquatic Invertebrates, of the Guidelines. As indicated previously in this document (see Section I5.5, Human Behavior), the relationships between companion animals and their owners or caretakers vary and should be carefully considered and respected when selecting an approach to euthanasia for these species.

Euthanasia of companion animals is best conducted in quiet, familiar environments when practical. The species being euthanized, the reason for euthanasia, and the availability of equipment and personnel will all contribute to decisions about the most appropriate location. The professional judgment of the veterinarian conducting or providing oversight for euthanasia is paramount in making appropriate decisions about euthanasia (eg, location, agent, route of administration) in species kept as companions and in the specific environments where they are encountered. Personnel conducting euthanasia must have a complete understanding of and proficiency in the euthanasia method to be used.

For individually owned companion animals, euthanasia will often be conducted in a private room in a veterinary clinic or in the home, to minimize animal and owner distress.<sup>1</sup> Factors leading to the decision to euthanize should be discussed openly,<sup>2</sup> and the animal's owner should be permitted to be present during euthanasia whenever feasible. Owners should be fully informed about the process they are about to observe, including the potential for excitation during anesthesia and other possible complications.<sup>1,3</sup> If one euthanasia method is proving difficult, another method should be tried immediately. Euthanasia should only be attempted when the necessary drugs and supplies are available to ensure a smooth procedure and, upon verification of death, owners should be verbally notified.<sup>4</sup>

In animal control, shelter, and rescue situations; research laboratories; and other institutional settings, trained technical personnel rather than veterinarians often perform euthanasia. Training and monitoring of these individuals for proficiency vary by setting and state (eg, animal control officers, animal care technicians in laboratories, certified euthanasia technicians in shelters in some states), as does the amount of veterinary supervision required. Euthanizing large numbers of animals on a regular basis can be stressful and may result in symptoms of compassion fatigue.<sup>5</sup> To minimize the stress and demands of this duty, trained personnel must be assured that they are performing euthanasia in the most humane manner possible. This requires an organizational commitment to provide ongoing professional training on the latest methods and materials available for euthanasia and effective management of compassion fatigue for all personnel.<sup>6</sup> In addition, personnel should be familiar with methods of restraint and euthanasia for all species likely to be encountered in their facility.

Areas where euthanasia is conducted in institutional settings should be isolated from other activities, where possible, to minimize stress on animals and to provide staff with a professional and dedicated work area. A well-designed euthanasia space provides good lighting with the ability to dim or brighten as required, ventilation, adaptable fixtures, and adequate space for at least 2 people to move around freely in different types of animal-handling situations.<sup>6,7</sup> Attempts should be made to minimize smells, sights, and sounds that may be stressors for animals being euthanized. Basic equipment for handling and restraint, a scale, clippers, tourniquets, stethoscope, cleaning supplies, a variety of needles and syringes, and body bags should be readily available to accommodate the needs of potentially diverse animal populations. In addition, a first-aid kit should be available to address minor human injuries, and medical attention should always be sought for bite injuries and more serious human injuries.

Euthanasia protocols for companion animals (usually dogs and cats) in institutional settings (eg, shelters, large breeding facilities, research facilities, quarantine facilities, racetracks) may differ from those applied in traditional companion animal clinical practices due to situation-specific requirements, including variable access to pharmaceuticals and other equipment, diagnostic and research needs (eg, postmortem tissue samples), and the number of animals to be euthanized. For this reason, general recommendations about euthanasia methods applicable to companion animals are followed by more specific information as to their applicability in frequently encountered environments. While protocols may differ, the interests of the animal must be given equal consideration whether the animal is individually owned or not.

## SI.2 ACCEPTABLE METHODS

### SI.2.1 NONINHALED AGENTS

*Barbiturates and barbituric acid derivatives*—Intravenous injection of a barbituric acid derivative (eg, pentobarbital, pentobarbital combination product) is the preferred method for euthanasia of dogs, cats, and other small companion animals. Barbiturates administered IV may be given alone as the sole agent of euthanasia or as the second step after sedation or general anesthesia. Refer to the product label or appropriate species references<sup>8</sup> for recommended doses. Current federal drug regulations require strict accounting for barbiturates, and these must be used under the supervision of personnel registered with the US DEA.

When IV access would be distressful, dangerous, or impractical (eg, small patient size such as puppies, kittens, small dogs and cats, rodents, and some other nondomestic species or behavioral considerations for some small exotic mammals and feral domestic animals), barbiturates and barbituric acid derivatives may be administered IP (eg, sodium pentobarbital, secobarbital; not pentobarbital combination products as these have only been approved for IV and intracardiac administration). Because of the potential for peritoneal irritation and pain (observed in rats),<sup>9</sup> lidocaine has been used with some success in rats to ameliorate discomfort.<sup>10,11</sup> Lidocaine was also used in combination with sodium pentobarbital in a laboratory comparison of IP and intrahepatic injection routes in cats from animal shelters.<sup>12</sup> Additional studies are necessary to determine applicability to and dosing for other species.

*Nonbarbiturate anesthetic overdose*—Injectable anesthetic overdose (eg, combination of ketamine and xylazine given IV, IP, or IM or propofol given IV) is acceptable for euthanasia when animal size, restraint requirements, or other circumstances indicate these drugs are the best option for euthanasia. Assurance of death is paramount and may require a second step, such as a barbiturate, or additional doses of the anesthetic. For additional information see Section M2, Noninhaled Agents, and Section S2, Laboratory Animals.

*Tributame*—While it is not currently being manufactured, Tributame is an acceptable euthanasia drug for dogs provided it is administered IV by an appropriately trained individual at recommended dosages and at proper injection rates. If barbiturates are not available, its extralabel use in cats is also acceptable. Routes of administration other than IV injection are not acceptable. Aesthetically objectionable agonal breathing may occur in unconscious animals and, consequently, the use of Tributame for owner-attended euthanasia is not recommended. While disconcerting for observers, because the animal is unconscious, agonal breathing has limited impact on its welfare.

*T-61*—T-61 is acceptable as an agent of euthanasia, provided it is administered appropriately by trained

individuals. Slow IV injection is necessary to avoid muscular paralysis prior to unconsciousness.<sup>13</sup> Routes other than IV are unacceptable. T-61 is also not currently being manufactured in the United States but is obtainable from Canada.

Should sodium pentobarbital become unavailable and manufacturing resume in the United States for Tributame and T-61, the latter 2 agents may become important for euthanasia of dogs and cats.

## SI.3 ACCEPTABLE WITH CONDITIONS METHODS

### SI.3.1 NONINHALED AGENTS

*Barbiturates and barbituric acid derivatives (alternate routes of administration)*—The IP route is not practical for medium or large dogs due to the volume of agent that must be administered and a prolonged time to death. A better choice for these animals when IV access is unachievable using manual restraint is general anesthesia followed by intraorgan injection. In unconscious or anesthetized animals, intraorgan injections (eg, intraosseous [Figure 4], intracardiac [Figure 5], intrahepatic [Figure 6], and intrarenal [Figure 7]<sup>14,15,a)</sup> may be used as an alternative to IV or IP injection of barbiturates when IV access is difficult.<sup>15</sup> Intraorgan injections may speed the rate of barbiturate uptake over standard IP injections, and when an owner is present, this approach may be preferred over the IP route.<sup>16</sup> The intrahepatic injection of a combination of sodium pentobarbital and lidocaine in awake cats from animal shelters caused rapid unconsciousness and was more accurately placed than IP injections.<sup>12</sup> Therefore, intrahepatic injection in awake cats may have limited application in controlled environments when conducted by trained personnel. However, positioning of awake cats for intrahepatic injection is in an upright position with the forequarters elevated rather than in lateral recumbency.

### SI.3.2 INHALED AGENTS

*Inhaled anesthetics*—Overdoses of inhaled anesthetics administered via chamber (eg, isoflurane, sevoflurane) are acceptable with conditions for euthanasia of small mammals and some other species < 7 kg because most vertebrates display aversion behavior to inhaled anesthetics (see Inhaled Agents section for details). Because of the potential for recovery, care must be taken to ensure death has occurred prior to disposing of animal remains. Inhaled anesthetics may also be used to anesthetize small fractious animals prior to administration of an injectable euthanasia agent.

*Carbon monoxide*—Carbon monoxide can be used effectively for euthanasia when required conditions for administration (see detailed discussion in Inhaled Agents section of the Guidelines) can be met. These conditions can be challenging and costly to meet on a practical basis, and there is substantial risk to personnel (hypoxia) if safety precautions are

not observed. Consequently, CO is acceptable with conditions for use in institutional situations where appropriately designed and maintained equipment and trained and monitored personnel are available to administer it, but it is not recommended for routine euthanasia of cats and dogs. It may be considered in unusual or rare circumstances, such as natural disasters and large-scale disease outbreaks. Alternate methods with fewer conditions and disadvantages are recommended for companion animals where feasible.

**Carbon dioxide**—Carbon dioxide can be used effectively for euthanasia when required conditions for administration (see detailed discussion in Inhaled Agents section of the Guidelines) can be met. However, just as for use of CO, this can be challenging and costly to do on a practical basis. Narcosis is a human safety risk associated with the use of CO<sub>2</sub>. Carbon dioxide is acceptable with conditions for use in institutional situations where appropriately designed and maintained equipment and trained and monitored personnel are available to administer it, but it is not recommended for routine euthanasia of cats and dogs. It may be considered in unusual or rare circumstances, including but not limited to, natural disasters and large-scale disease outbreaks. Alternate methods with fewer conditions and disadvantages are recommended for companion animals where feasible.

### SI.3.3 PHYSICAL METHODS

**Gunshot**—Gunshot should only be performed by highly skilled personnel trained in the use of firearms (eg, animal control and law enforcement officers, properly trained veterinarians) and only in jurisdictions that allow for legal firearm use. A method acceptable with conditions, use of gunshot may be appropriate in remote areas or emergency situations in which withholding death by gunshot will result in prolonged, unrelieved pain and suffering of the animal or imminent danger to human life. Protocols for ensuring a humane death by gunshot have been described<sup>17,18</sup> and preferred anatomic sites for use of gunshot for dogs and cats are provided in **Figures 8 and 9**, respectively. Pre-euthanasia sedation (eg, medication added to food) is recommended, whenever possible, for cats since they may be difficult to shoot humanely.<sup>17</sup> Gunshot is not recommended as a routine approach to the euthanasia of dogs, cats, or other small companion animals, and should not be used when other methods are available and practicable.

**PCB**—Use of a PCB by trained personnel in a controlled laboratory setting has been described as an effective and humane method of euthanasia for rabbits and dogs.<sup>19</sup> The bolt must be placed directly against the skull; therefore, safe and effective application of the technique may be facilitated by pre-euthanasia sedation or anesthesia. Penetrating captive bolt is not recommended as a routine approach to the euthanasia of dogs, cats, or other small companion animals, and should not be used when other methods are available and practicable.

## SI.4 ADJUNCTIVE METHODS

**Potassium chloride**—Potassium chloride (1 to 2 mmol/kg, 75 to 150 mg/kg, or 1 to 2 mEq K<sup>+</sup>/kg) administered IV or intracardially may be used to euthanize companion animals when they are unconscious (unresponsive to noxious stimuli) or under general anesthesia. Use of potassium chloride in awake animals is unacceptable.

**Nitrogen or argon**—Gradual displacement methods using N<sub>2</sub> or Ar, alone or with other gases, in awake dogs and cats may result in hypoxia prior to loss of consciousness (see Inhaled Agents section of the Guidelines for details). Therefore, administration of N<sub>2</sub> or Ar (< 2% O<sub>2</sub>) should only be used as an adjunctive method for unconscious or anesthetized dogs and cats; prolonged exposure may be necessary to ensure death. Alternate methods with fewer conditions and disadvantages are recommended whenever feasible.

**Electrocution**—Electrocution using alternating current in dogs rendered unconscious by an acceptable means (eg, general anesthesia) may be used for euthanasia (see Section M3.8 of the Guidelines for details). The disadvantages of electrocution outweigh its advantages; therefore it is not recommended for routine use in companion animals. Alternate methods with fewer conditions and disadvantages should be used whenever feasible.

## SI.5 UNACCEPTABLE METHODS

With the exception of IM delivery of select injectable anesthetics, the SC, IM, intrapulmonary, and intrathecal routes of administration are unacceptable for administration of injectable euthanasia agents because of the limited information available regarding their effectiveness and high probability of pain associated with injection in awake animals.

Household chemicals, disinfectants, cleaning agents, and pesticides are not acceptable for administration as euthanasia agents.

Other unacceptable approaches to euthanasia include hypothermia and drowning.

## SI.6 SPECIAL CONSIDERATIONS

### SI.6.1 DANGEROUS OR FRACTIOUS ANIMALS

Animals that are unable to be safely and humanely restrained should be sedated by means of drugs delivered orally (eg, gelatin capsules for delivery of drugs in food,<sup>20</sup> liquid formulations squirted into mouths<sup>21</sup>) or remotely (eg, darts, pole syringes) before administration of euthanasia agents. Doing so will assist in relieving anxiety and pain for the animal, in addition to reducing safety risks for personnel. There is a variety of pre-euthanasia drugs that can be administered PO, SC, or IM, alone or in combination, to render animals unconscious with minimal handling in preparation for euthanasia.<sup>22</sup>

### SI.6.2 DISPOSAL OF ANIMAL REMAINS

Residues of injectable agents commonly used for euthanasia of companion animals (eg, sodium pento-



barbital) tend to persist in the remains and may cause sedation or even death of animals that consume the body. For this reason safe handling and appropriate disposal of the remains are critically important. Additional information is available in Section I8, Disposal of Animal Remains.

## **SI.7 FETUSES AND NEONATES**

Scientific data<sup>23</sup> indicate that mammalian embryos and fetuses are in a state of unconsciousness throughout pregnancy and birth. For dogs and cats, this is in part due to moderate neurologic immaturity, with sentience being achieved several days after birth. The precocious young of guinea pigs remain insentient and unconscious until 75% to 80% of the way through pregnancy and remain unconscious until after birth due to chemical inhibitors (eg, adenosine, allopregnanolone, pregnanolone, prostaglandin D<sub>2</sub>, placental peptide neuroinhibitor) and hypoxic inhibition of cerebrocortical activity.<sup>23</sup> As a consequence, embryos and fetuses cannot consciously experience feelings such as breathlessness or pain. Therefore, they also “cannot suffer while dying in utero after the death of the dam, whatever the cause.”<sup>23</sup> Information about developing nonmammalian eggs is available in the S5, Avians; S6, Finfish and Aquatic Invertebrates; and S7, Zoologic and Free-Ranging Nondomestic Animals sections of the Guidelines.

Euthanasia of dogs, cats, and other mammals in mid- or late-term pregnancy should be conducted via an injection of a barbiturate or barbituric acid derivative (eg, sodium pentobarbital) as previously described. Fetuses should be left undisturbed in the uterus for 15 to 20 minutes after the bitch or queen has been confirmed dead. This guidance is also generally applicable to nonmammalian species, with euthanasia of eggs per guidance provided in the S5, Avians; S6, Finfish and Aquatic Invertebrates; and S7 Zoologic and Free-Ranging Nondomestic Animals sections of the Guidelines. Intraperitoneal injections of pentobarbital should be avoided whenever possible during the later stages of pregnancy due to the likelihood of inadvertently entering the uterus, rendering the injection ineffective.

Altricial neonatal and preweanling mammals are relatively resistant to euthanasia methods that rely on hypoxia as their mode of action. It is also difficult, if not impossible, to gain venous access. Therefore, IP injection of pentobarbital is the recommended method of euthanasia in preweanling dogs, cats, and small mammals. Intraosseous injection may also be used, if strategies are used to minimize discomfort from injection by using intraosseous catheters that may be in place (see Section M2, Noninhaled Agents, of the Guidelines), or if the animal is anesthetized prior to injection.

During ovariohysterectomy of pregnant dogs and cats and small mammals with altricial neonates, ligation of the uterine blood vessels with retention of the fetuses inside the uterus will result in death of

the fetuses. The resistance of altricial neonates (eg, cats, dogs, mice, rats) to euthanasia methods whose mechanisms rely on hypoxia suggests that the uterus should not be opened for substantially longer periods than for precocial neonates,<sup>24</sup> perhaps 1 hour or longer. In the case of caesarian section in late-term pregnancy, IP injection of pentobarbital is recommended for fetuses that must be euthanized for congenital deformities or illness and that have been removed from the uterus (creating the potential that successful breathing may have occurred).

## **SI.8 EUTHANASIA IN SPECIFIC ENVIRONMENTS**

### **SI.8.1 INDIVIDUAL ANIMALS IN PRESENCE OF OWNERS**

Pre-euthanasia sedation or anesthesia should be provided whenever practicable, either before or after the owner(s) has had the opportunity to spend some final moments with their pet. Once the animal is calm, either direct venipuncture or use of an IV catheter is acceptable for IV injection of the euthanizing agent. Use of an IV catheter prevents repeat injections and minimizes the need for restraint while pet owners are present. When circulation is compromised by the animal's condition and sedation or anesthesia may reduce the likelihood of successful injection, it may be necessary to proceed with IV injection in the awake animal, or another route of administration of euthanizing agent might be considered. Alternatively, general anesthesia may be induced, followed by administration of a euthanasia agent.

### **SI.8.2 BREEDING FACILITIES**

Euthanasia protocols in large breeding facilities may differ from those utilized in a clinical practice setting. Indications for euthanasia in breeding facilities include neonates with congenital defects, acquired abnormalities or diseases within any segment of the population, or other conditions that render animals unsuitable for breeding or sale. Euthanasia may be performed on an individual-animal basis, or in groups. Euthanasia method is determined by animal species, size, age, and number of animals to be euthanized. Barbiturates are commonly administered IV or IP for individual euthanasia of any species, and for all ages of dogs and cats. Carbon dioxide euthanasia is commonly utilized for individual or group euthanasia of small animals, including ferrets, rodents, and rabbits. Regardless of method and number of animals being euthanized, procedures must be performed in a professional, compassionate manner by trained individuals under veterinary oversight. Appropriate techniques for assuring death must be applied individually, regardless of the number of animals being euthanized.

### **SI.8.3 ANIMAL CONTROL, SHELTERING, AND RESCUE FACILITIES**

The preferred method of euthanasia in these facilities is injection of a barbiturate or barbituric acid

derivative with appropriate animal handling. When euthanizing animals that are well socialized without pre-euthanasia sedation or anesthesia, appropriate handling usually involves 2 trained people. One individual restrains the animal and the other administers the euthanasia agent.<sup>25</sup>

When euthanizing distressed, dangerous, or fractious animals, a sedative or anesthetic should be administered prior to attempting euthanasia. When the necessary restraint can be performed safely (appropriate handling techniques and equipment must be used), a pre-euthanasia sedative or anesthetic can be delivered IM or PO. After administration of the sedative or anesthetic, the animal is released so that it can return to a comfortable low-stress location (eg, dimly lighted cage or area) while the drug takes effect.<sup>22</sup> Because of the diversity of animals received by shelters, technicians performing euthanasia must have a good understanding of animal behavior and restraint, the proper use of equipment, and the variety of euthanasia drugs available and their effects.<sup>26</sup>

### **SI.8.4 LABORATORY ANIMAL FACILITIES**

Euthanasia for companion animals in scientific settings must be approved by the IACUC. The IACUC has mandatory veterinary input and considers animal welfare, requirements for postmortem tissue specimens, and interference of euthanasia agents or methods with study results. Scientific and husbandry staff form strong emotional bonds with companion animals in scientific settings, so sensitivity to grief and compassion fatigue is necessary.

## **S2 Laboratory Animals**

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method can be met.

### **S2.1 GENERAL CONSIDERATIONS**

General comments about companion animals, farm animals, poikilotherms, and birds are provided elsewhere in the Guidelines, and usually apply to these species in the laboratory setting. Some other commonly used laboratory animal species are addressed later in the text. Most laboratory mammals currently used in biomedical research are small rodents that are maintained in large numbers. Venous access in these animals is typically difficult, and injectable agents are usually delivered via the IP route.

In addition to humane outcomes, an important consideration in the choice of method for euthanasia of laboratory animals is the research objectives for the animals being euthanized. Euthanasia methods can lead to metabolic and histologic artifacts that may affect research outcomes. For example, isoflurane may artificially elevate blood glucose concentrations,<sup>27</sup> while IP injection of barbiturates can create artifacts in intestinal tissues<sup>28</sup> and euthanasia by inhalation of CO<sub>2</sub> may elevate serum potassium concentrations.<sup>29</sup> Time elapsed between euthanasia

and tissue collection can also be a critical factor affecting choice of euthanasia method.<sup>30-32</sup> Research needs may require the use of an adjunctive method (eg, bilateral thoracotomy, exsanguination, perfusion with fixatives, injection of potassium chloride). The application of such adjunctive methods is acceptable when the animal is fully anesthetized. Animals used in infectious disease studies may require special handling for animal and human health and safety.

### **S2.2 SMALL LABORATORY AND WILD-CAUGHT RODENTS (MICE, RATS, HAMSTERS, GUINEA PIGS, GERBILS, DEGUS, COTTON RATS, ETC)**

All activities related to the euthanasia of rodents deserve consideration equivalent to the euthanasia method itself, and may factor into the choice of method. Activities that contribute to distress in rodents include transport, handling (in animals not accustomed to it), disruption of compatible groups, and elimination of established scent marks.<sup>31-45</sup> As eliminating all sources of distress may not be practical or possible, the selected method of euthanizing rodents should minimize these sources of potential distress. Methods of euthanasia likely to elicit distress vocalizations or pheromones that other animals in the room could hear or smell may be best performed in another location, if transportation distress can be minimized. Similarly, wild-caught animals should be handled and euthanized in the manner least stressful to the animals. Death should be confirmed by physical examination, ensured by adjunctive physical method, or obviated by validation of euthanasia chambers and process.<sup>46</sup>

#### **S2.2.1 ACCEPTABLE METHODS**

*Barbiturates and barbituric acid derivatives*—Injectable barbiturates and barbiturate combinations generally act quickly and smoothly to render rodents unconscious. The euthanasia dose is typically 3 times the anesthetic dose. Pentobarbital is the most commonly used barbiturate for laboratory rodents because of its long shelf life and rapidity of action. There are reports that pain may be associated with barbiturate injections given via the IP route,<sup>10,11,47,48</sup> but the degree of pain and a suitable method for controlling pain have yet to be defined. The concurrent use of local anesthetics and anticonvulsants may aid in prevention of pain,<sup>47</sup> but it should be considered that these compounds may also cause pain with IP injection.

*Dissociative agent combinations*—In conscious rodents, ketamine and similar dissociative agents should be used in combination with an  $\alpha_2$ -adrenergic receptor agonist such as xylazine or benzodiazepines such as diazepam.<sup>49</sup>

## S2.2.2 ACCEPTABLE WITH CONDITIONS METHODS

### S2.2.2.1 Inhaled agents

*Halogenated anesthetics*—Halothane, isoflurane, sevoflurane, or desflurane, with or without nitrous oxide, is acceptable with conditions for euthanasia of laboratory rodents.<sup>50</sup> These agents may be useful in cases where physical restraint is difficult or impractical. When used as a sole euthanasia agent delivered via vaporizer for anesthetic induction and overdose, animals may need to be exposed for prolonged time periods to ensure death.<sup>51-57</sup> Death can be rapid when using the open-drop technique, but care must be taken to ensure that the rodent does not come in direct contact with the anesthetic.

*Carbon dioxide*—Carbon dioxide, with or without premedication with halogenated anesthetics, is acceptable with conditions for euthanasia of small rodents.<sup>58</sup> Compressed CO<sub>2</sub> gas in cylinders are the recommended source of CO<sub>2</sub> because gas inflow to the chamber can be precisely regulated. An optimal flow rate for CO<sub>2</sub> euthanasia systems should displace 30% to 70% of the chamber or cage volume/min, with the understanding that there is potential for increased distress due to dyspnea at lower flow rates or mucous membrane pain associated with flow rates at the high ends of this range.<sup>31,32,54,56,59-64</sup> However, as there is no clear evidence of a flow rate that optimally minimizes both pain and distress for all species, sexes, and genetic backgrounds, veterinarians should use their professional judgment to determine which flow rate is appropriate for their circumstances.<sup>31,32,56</sup> Prefilled chambers are not recommended due to the potential for significant pain upon inhalation of the gas.<sup>60,65</sup> If euthanasia is not conducted in the home cage, induction chambers should be emptied and cleaned between uses. Addition of O<sub>2</sub> to CO<sub>2</sub> will prolong the time to death and may complicate determination of consciousness. There appears to be no advantage to combining O<sub>2</sub> with CO<sub>2</sub> for euthanasia.<sup>11,60</sup>

*Carbon monoxide*—Although CO administration is not commonly used in laboratory animal settings and has been determined to be as aversive as other inhalants,<sup>52,66</sup> it is acceptable with conditions as a method of rodent euthanasia when the conditions for effective and safe use can be met (see Inhaled Agents).

*Nitrous oxide*—Although nitrous oxide may be less aversive than the other inhaled gases described in this document,<sup>67</sup> it is a weak anesthetic with a long time to loss of consciousness and should not be used alone.<sup>68</sup> Nitrous oxide can be used in conjunction with other gases to shorten the time to loss of consciousness.<sup>50,69</sup>

### S2.2.2.2 Noninhaled agents

*Tribromoethanol*—Although unavailable as a commercial or pharmaceutical-grade (USP/National Formulary/British Pharmacopeia) product, tribromoethanol is a commonly used rodent anesthetic. Its use is controversial due to its reported adverse effects

(peritonitis and death).<sup>70</sup> However, many IACUCs have approved its use in rodents. Because there are no reports of tribromoethanol being used as a sole agent for euthanasia, it is recommended only as an anesthetic before the application of an approved secondary method.<sup>70,71</sup> Tribromoethanol must be prepared and stored properly and administered at the appropriate dosage.

*Ethanol*—Intraperitoneal injections of 70% to 100% ethanol may be an appropriate method of euthanasia for adult mice when physical methods are not desired or other euthanasia agents are unavailable.<sup>72-75</sup> Mice injected with 0.5 mL of 70% or 100% ethanol demonstrated gradual loss of muscle control, loss of righting reflex, respiratory and cardiac arrest, and death in 2 to 4 minutes.<sup>72,74</sup> The use of ethanol in mice < 35 days of age is questionable due to the long latency to death.<sup>75</sup> Ethanol is not recommended in larger species such as rats due to the large volume required to induce death.<sup>74,75</sup>

### S2.2.2.3 Physical methods

*Cervical dislocation*—Cervical dislocation is used in laboratory settings. Cervical dislocation requires neither special equipment nor transport of the animal and yields tissues uncontaminated by chemical agents. Loss of cortical function following cervical dislocation is rapid and occurs within 5 to 10 seconds as measured by a significant reduction in amplitude recordings of visual evoked responses and EEG.<sup>76,77</sup> Cervical dislocation is acceptable with conditions for mice and rats < 200 g. Personnel should be trained on anesthetized and/or dead animals to demonstrate proficiency.

*Decapitation*—Decapitation is used in laboratory settings because it yields tissues uncontaminated by chemical agents. Loss of cortical function following decapitation is rapid and occurs within 5 to 30 seconds as measured by a significant reduction in amplitude recordings of visual evoked responses and EEG changes.<sup>76-78</sup> Specialized rodent guillotines are available and must be kept clean, in good condition with sharp blades. If handled correctly, rats and mice do not show evidence of hypothalamic-pituitary-adrenal axis activation from decapitation or from being present when other rats or mice are decapitated.<sup>79,80</sup> Decapitation is acceptable with conditions for mice and rats. Personnel should be trained on anesthetized or dead animals to demonstrate proficiency.

*Focused beam microwave irradiation*—Focused beam microwave irradiation, using a machine professionally designed for animal euthanasia (see Physical Methods), is acceptable with conditions for euthanizing mice and rats. It is the preferred method when immediate fixation of brain metabolites is required for research purposes.

## S2.2.3 UNACCEPTABLE METHODS

### S2.2.3.1 Inhaled agents

*Nitrogen and argon*—Administration of N<sub>2</sub> or Ar is only acceptable in anesthetized mammals, as a

coexisting O<sub>2</sub> concentration of < 2% is necessary to achieve unconsciousness and death. Achieving that condition is difficult. In addition, Ar has been shown to be highly aversive to rats.<sup>81</sup> Although N<sub>2</sub> and Ar can kill animals,<sup>82-84</sup> other methods of euthanasia are preferable.

#### S2.2.3.2 Noninhaled agents

*Potassium chloride*—Intravenous or intracardiac administration of potassium chloride is not acceptable as a sole approach to euthanasia.

*Neuromuscular blocking agents*—Paralytic agents are unacceptable for use as sole euthanasia agents.

*Injectable barbiturates and neuromuscular blocking agents*—Combining injectable barbiturates and neuromuscular blocking agents in the same syringe for administration is unacceptable because the neuromuscular blocking agents may take effect before the animal is anesthetized.

*Opioids*—Opioids are unacceptable for euthanasia of laboratory animals as they are not rapidly acting, require high doses, and are not true anesthetic agents.

*Urethane*—Urethane is a human carcinogen used as a laboratory rodent anesthetic under certain conditions. It has a slow onset of action but a long duration of anesthesia. Because there are no reports of urethane being used as a sole agent for euthanasia, it is recommended only as an anesthetic before the application of an approved adjunctive method.<sup>53,70,71</sup>

*α-Chloralose*—α-Chloralose is unacceptable as a sole agent of euthanasia. α-Chloralose is a hypnotic agent that has poor analgesic properties<sup>53,71</sup> and is recommended only as an anesthetic before the application of an approved adjunctive method.

## S2.2.4 FETUSES AND NEONATES

Mammalian fetuses are unconscious in utero due to a combination of factors, such as low oxygen tension and hormonal influences in the uterus suppressing consciousness. Rat and mouse pups are born neurologically immature when compared with humans, and their afferent pain pathways are not well developed until after postnatal day 5 to 7, with cortical development occurring later.<sup>85-90</sup> Any laboratory rodents with altricial young, such as mice and rats, must be differentiated from rodents with precocial young, such as guinea pigs. Precocial young should be treated as adults.

#### S2.2.4.1 Acceptable methods

*Euthanasia of the dam and mammalian fetuses*—Rodent fetuses along with other mammals are unconscious in utero and hypoxia does not evoke a response.<sup>91</sup> Therefore, it is unnecessary to remove fetuses for euthanasia after the dam is euthanized.

##### S2.2.4.1.1 Noninhaled agents

*Injectable barbiturates alone and in combination with local anesthetics and anticonvulsants; dissociative agents combined with α<sub>2</sub>-adrenergic receptor agonist or benzodiazepines*—These agents

are acceptable for use in fetuses or neonates.<sup>92</sup> See discussion on the use of these agents in adult rodents.

#### S2.2.4.2 Acceptable with conditions methods

##### S2.2.4.2.1 Inhaled agents

*Inhaled anesthetics*—Nonflammable volatile anesthetic agents are effective for in utero fetuses. Neonatal mice may take up to 50 minutes to die from CO<sub>2</sub> exposure,<sup>93</sup> and neonatal rats may take as long as 35 minutes.<sup>94</sup> Adequate exposure time should be provided, or an adjunctive method (eg, cervical dislocation, or decapitation) should be performed after a neonate is nonresponsive to painful stimuli. An adjunctive method (eg, cervical dislocation, decapitation) must be performed when halogenated anesthetics are used on neonatal rodents to avoid the possibility of recovery.<sup>55</sup>

##### S2.2.4.2.2 Physical methods

*Hypothermia*—The gradual cooling of fetuses and altricial neonates (mice and rats) is acceptable with conditions. There are no data to support the use of hypothermia as a single method, and it should be followed with a secondary method following loss of movement. As cold surfaces can cause tissue damage and presumably pain, the animals should not come in direct contact with ice or precooled surfaces. Hypothermia for anesthesia is not recommended after approximately 10 days of age.<sup>53,88-90,95-97</sup> Therefore, it is also an unacceptable euthanasia method in animals older than this age.<sup>98</sup>

*Rapid freezing*—Mouse and rat fetuses and neonates < 5 days of age may be quickly killed by rapid freezing in liquid N<sub>2</sub>.<sup>23,96,97</sup>

*Decapitation*—Decapitation using scissors or sharp blades is acceptable with conditions for altricial neonates.<sup>96,97</sup> Some rodent neonates, whether altricial or precocial, may have a tissue mass that is too large for scissors, so appropriate decapitation tools should be selected.

*Cervical dislocation*—Cervical dislocation by pinching and disrupting the spinal cord in the high cervical region is acceptable with conditions for fetal and neonatal mice and rats.

## S2.3 LABORATORY FARM ANIMALS, DOGS, CATS, FERRETS, AND NONHUMAN PRIMATES

### S2.3.1 GENERAL CONSIDERATIONS

The research goals will often influence the choice of method of euthanasia for farm animals, dogs, cats, and ferrets. Generally, sedation (as needed) followed by IV injectable barbiturates will be the preferred method. Tributame administered IV by trained personnel may be an appropriate replacement for dogs if injectable barbiturates are not available. For more information on other methods of euthanasia of farm and companion species, consult the appropriate sections of the guidelines.

For nonhuman primates and other wild-caught or nondomesticated animals used in the laboratory, some general principles apply. Again, the research

being conducted may influence the choice of euthanasia method, and if the institutional animal care and use program staff is unfamiliar with a species, researchers working with the species may provide valuable guidance. Appropriate restraint for the species must always be applied. Distress in animals unfamiliar with handling should be minimized. Venous access should be established or IM agents may be used (delivered via remote injection equipment if necessary) for sedation. These animals are preferentially euthanized with an injectable barbiturate.

### **S2.3.2 SPECIAL CASES**

When animals to be euthanized are fully anesthetized, adjunctive methods such as bilateral thoracotomy, exsanguination, perfusion, and IV or intracardiac injection of potassium chloride are acceptable.

## **S2.4 LABORATORY RABBITS**

### **S2.4.1 GENERAL CONSIDERATIONS**

Recommended euthanasia methods of rabbits depend on the facilities and conditions in which the animals are housed and maintained. In a controlled setting such as a biomedical research facility where researchers have access to restraint devices and controlled drugs, IV injection of barbiturates is usually used. In large commercial production operations for biomedical research or meat, or to safely euthanize injured wild rabbits, the method selected will depend on the availability of resources and the skill and training of the operator. In all situations, the animals should be handled and euthanized in the manner least distressful to them. Death should always be verified. Lack of breathing and palpable heartbeat as well as a fixed dilated pupil are some of the easiest recognized indicators of death.

### **S2.4.2 ACCEPTABLE METHODS**

#### **S2.4.2.1 Noninhaled agents**

*Barbiturates and barbituric acid derivatives*—If rabbits are conditioned to handling or restraint devices are available, venous access may be obtained via the ear. In the case of fractious rabbits, sedation may be necessary to gain venous access for administration of an injectable barbiturate or injectable barbiturate combination. Barbiturates may also be administered IP. The concurrent use of local anesthetics and anticonvulsants may aid in prevention of pain,<sup>47</sup> but it should be considered that these compounds may also cause pain with IP injection. These approaches are acceptable for companion rabbits as well.

### **S2.4.3 ACCEPTABLE WITH CONDITIONS METHODS**

#### **S2.4.3.1 Inhaled agents**

*Halogenated anesthetics*—Inhaled anesthetics will generally be available only in a controlled setting, such as a biomedical research facility or veterinary care provider. In these situations, it is best

to preanesthetize the animal with a sedative before removing it from the home cage and relocating it to access restraint devices and a gas anesthesia machine. This method will reduce their natural tendency to breath-hold when confronted with unpleasant odors.<sup>99-101</sup> Animals already under anesthesia may be euthanized by an overdose of anesthetic.

*Carbon dioxide*—The recommended CO<sub>2</sub> displacement rate for rabbits is 50% to 60% of the chamber or cage volume/min. As fossorial animals, rabbits appear to have a higher tolerance for elevated CO<sub>2</sub> levels, so its use as a sole euthanasia agent may cause distress.<sup>102,103</sup> In high concentrations (70%, 80%, 90%, 98%), CO<sub>2</sub> has been reported<sup>104</sup> to result in aversive behaviors for 15 seconds before the onset of unconsciousness. Walsh<sup>b</sup> reported no distress behaviors observed when CO<sub>2</sub> was administered to rabbits at lower flow rates of approximately 28% and 58% chamber volume replacement/min. The fast-flow rate is recommended for CO<sub>2</sub> euthanasia, as it resulted in significantly earlier loss of sensibility (40 seconds) and death than gradual fill (99 seconds).<sup>b</sup> Premedication with sedatives may reduce potential aversion responses.

#### **S2.4.3.2 Physical methods**

*Cervical dislocation*—Cervical dislocation is acceptable with conditions for rabbits when performed by individuals with a demonstrated high degree of technical proficiency. The need for technical competency is great in heavy or mature rabbits in which the large muscle mass in the cervical region makes manual cervical dislocation more difficult. Mechanical devices designed to firmly hold the rabbit's head and facilitate the operator's applying downward force to the hips and back legs reduce the strength needed by the operator to euthanize rabbits. These devices have been shown to be highly effective (96%) for preweaned kits, growers, and adults. Training with cadavers is recommended.<sup>105</sup>

*PCB*—The use of rabbit-sized PCBs to euthanize rabbits in laboratory or production facilities is acceptable with conditions. The captive bolt must be maintained in clean working order, positioned correctly (by placing the captive bolt slightly paramedian on the frontal bone as close to the ears as possible),<sup>106</sup> and operated safely by trained personnel. It is essential to stabilize the head to prevent misses. Animals should be restrained on nonslip flooring, preferably in an open-top container allowing the rear of the rabbit to be pressed against the container wall. Using the nondominant hand, the operator should restrain the rabbit by pressing on the shoulder blades, and the thumb and forefinger should be placed gently around the neck of the rabbit. These devices are often aesthetically displeasing and often result in environmental contamination, which may be a significant concern when sick animals are being removed from the colony. Operators must be trained, preferably on cadavers.

*NPCB*—The use of rabbit-sized NPCB to eutha-

nize rabbits in laboratory or production facilities is acceptable with conditions. The NPCB has been shown to result in immediate insensibility in 100% of the events.<sup>105</sup> Animals should be restrained on non-slip flooring, preferably in an open-top container allowing the rear of the rabbit to be pressed against the container wall. Using the nondominant hand, the operator should restrain the rabbit by pressing on the shoulder blades, and the thumb and forefinger should be placed gently around the neck of the rabbit. The device must be maintained in clean working order, positioned correctly (center of the forehead, with the barrel placed in front of the ears and behind the eyes), and discharged twice in rapid succession at the pressure recommended for the age and size of the rabbit (55 psi for preweaned kits, 70 psi for growers, 90 psi for adults; **Figure 10**).<sup>105</sup> Operators must be trained, preferably on cadavers.

#### **S2.4.4 SPECIAL CASES**

When rabbits to be euthanized are in a surgical plane of anesthesia, adjunctive methods such as delivery of potassium chloride, exsanguination, or bilateral thoracotomy are acceptable.

Manual application of blunt force trauma to the head has been shown to be difficult and aesthetically displeasing, resulting in undesired tissue damage, as well as being less effective than other means.<sup>105,107,b</sup> Blunt force trauma should be used only in emergency situations under extenuating circumstances, such as an injured rabbit too large for the operator to cervically dislocate and an operator without any supporting resources.

### **S2.5 LABORATORY FISH, AMPHIBIANS, AND REPTILES**

Recommending euthanasia methods for finfish, aquatic invertebrates, amphibians, and reptiles used in biomedical research is challenging due to the enormous number of species in use and variations in their biological and physiologic characteristics. In this section, only the most commonly used methods will be discussed for several frequently used species. Other methods less often used for euthanizing species used in research are discussed in detail in the relevant sections of the Guidelines. See these sections for additional information.

There are no US FDA-approved drugs for euthanasia of aquatic animals. Tricaine methanesulfate is an FDA-approved drug for temporary immobilization (sedation, anesthesia) of finfish, amphibians, and other aquatic, cold-blooded animals. Immersion of adult zebrafish in MS 222 for 10 minutes following loss of rhythmic opercular movement was previously recommended. However, because recovery of fish after exposure for this time has been shown to occur, 30 minutes is recommended as a precautionary measure until research is available to demonstrate immersion times needed to reliably cause irreversible death in zebrafish. Zebrafish show some signs of stress when im-

mersed in MS 222, and a secondary (physical) method of euthanasia is recommended to ensure death.<sup>108</sup> MS 222 alone is not effective for euthanasia of zebrafish eggs, embryos, or larvae (< 14 days old), and other methods should be used for these life stages.<sup>109</sup>

As described in the aquatics section it is acceptable for zebrafish (*Danio rerio*) to be euthanized by rapid chilling (2° to 4°C) until loss of orientation and cessation of opercular movements. Subsequent additional exposure of the fish to chilled water for times specific to fish size and age<sup>108,110,111</sup> should be used to ensure death. Rapid chilling of adult zebrafish resulted in cessation of vital signs (10.6 ± 3.28 seconds) 20 times as fast as in the case of MS 222 overdose (216.3 ± 62 seconds).<sup>112</sup> Adult zebrafish should be exposed for a minimum of 10 additional minutes following the loss of opercular movements. Zebrafish fry 4 to 7 days after fertilization (dpf) should be exposed for at least 20 additional minutes following loss of opercular movements.<sup>113</sup> Rapid chilling (as well as MS 222) has been shown to be an unreliable euthanasia method for embryos < 3 dpf.<sup>108,112,114</sup> Immersion in diluted sodium or calcium hypochlorite solution is acceptable for embryos up to 7 days of age.<sup>115</sup> If necessary to ensure death of other life stages, rapid chilling may be followed by either an approved adjunctive euthanasia method or a humane killing method. Until further research is conducted, rapid chilling is acceptable with conditions for other small-bodied tropical and subtropical stenothermic species.

Amphibian species commonly used in research include the African and Western clawed frog (*Xenopus laevis*, *Xenopus tropicalis*), leopard and bull (*Rana* spp) frogs, and axolotls (*Ambystoma mexicanum*). These species are best euthanized via a physical method while fully anesthetized. While injection of sodium pentobarbital IV, intracelomically, or in the lymph spaces is an acceptable method of euthanasia of these species, high doses are often required and these agents may have an inconsistent time to loss of consciousness (S7.3.4.1).<sup>116</sup>

## **S3. Animals Farmed for Food and Fiber**

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method are met.

### **S3.1 GENERAL CONSIDERATIONS**

While some methods of slaughter and depopulation might meet the criteria for euthanasia identified by the POE, others will not and comments in this document are limited to methods used for euthanasia. The following section relates to species of animals domesticated for agricultural purposes, specifically cattle, sheep, goats, swine, and poultry, regardless of the context in which that animal is being kept or the basis for the decision to euthanize it. Suggestions for euthanasia of agricultural animals such as camelids, bison, and water buffalo, which are customarily

raised to meet niche market demands for fiber and food, are also included.

Handling of animals prior to euthanasia should be as stress free as possible. This is facilitated by ensuring that facilities are well designed, appropriate equipment is available, and animal handlers are properly trained and their performance is monitored.<sup>117-121</sup>

Regardless of the method of euthanasia used, death must be confirmed before disposal of the animal's remains. The most important indicator of death is lack of a heartbeat. However, because this may be difficult to evaluate or confirm in some situations, animals can be observed for secondary indicators of death, which might include lack of movement over a period of time (30 minutes beyond detection of a heartbeat) or the presence of rigor mortis.

## **S3.2 BOVIDS AND SMALL RUMINANTS**

### **S3.2.1 BOVIDS**

#### **S3.2.1.1 Acceptable methods**

##### **S3.2.1.1.1 Noninhaled agents**

*Barbiturates and barbituric acid derivatives*—Barbiturates act rapidly and normally induce a smooth transition from consciousness to unconsciousness and death—a desirable outcome for the operator and observers. Although cost is a deterrent to the use of barbiturates for euthanasia of large numbers of animals, these agents tend to be less expensive than other injectable pharmaceuticals. Drawbacks to the use of barbiturates are that their administration requires adequate restraint of the animal, personnel who are registered with the US DEA (and other appropriate state authority where required), strict control over the drug with accounting of the amount used,<sup>122</sup> and fewer options for disposal of animal remains because of potential residues.

#### **S3.2.1.2 Acceptable with conditions methods**

##### **S3.2.1.2.1 Physical methods**

In emergency situations, such as euthanasia of a bovid that is not restrained, it may be difficult to restrain a dangerous animal for IV injection. While administration of a sedative might be desirable, in some situations it is possible the animal could injure itself or bystanders before a sedative could take effect. In such cases, a neuromuscular blocking agent (eg, succinylcholine) may be administered to the bovid IM or IV, but the bovid must be euthanized via an appropriate method as soon as the bovid can be controlled. Succinylcholine alone or without sufficient anesthetic is not acceptable for euthanasia.

*Gunshot*—Gunshot is the most common method used for on-farm euthanasia of cattle.<sup>123</sup> Death is caused by destruction of brain tissue and the degree of brain damage inflicted by the bullet is dependent on the firearm, type of bullet (or shotshell for shotguns), and accuracy of aim.

*Handguns*—Handguns or pistols are short-barreled firearms that may be fired with 1 hand. For euthanasia, use of handguns is limited to close-range

shooting (within 1 to 2 feet or 30 to 60 cm) of the intended target. Calibers ranging from .32 to .45 are recommended for euthanasia of cattle.<sup>124</sup> Bullets should be selected to have adequate penetration ability. Older types of hollow-point bullets are designed to expand and fragment on impact with their targets, which reduces the depth of penetration. Under ideal conditions and good penetration of the skull, hollow-point bullets are able to cause extensive damage to neural tissues; however, because penetration of the skull is the first criterion in euthanasia, a solid lead bullet is preferred. Since the publication of the previous edition, many new types of bullets and firearms are now available. These must be of sufficient muzzle velocity to ensure penetration. The muzzle velocity specifications are on most ammunition packaging. The .22 caliber handgun is generally not recommended for routine euthanasia of adult cattle regardless of bullet used, because of the inability to consistently achieve desirable muzzle energies with standard commercial loads.<sup>124</sup>

*Rifles*—A rifle is a long-barreled firearm that is usually fired from the shoulder. Unlike the barrel of a shotgun, which has a smooth bore for shot shells, the bores of handgun and rifles contain a series of helical grooves (called rifling) that cause the bullet to spin as it travels through the barrel. Rifling imparts stability to the bullet and improves accuracy. For this reason, rifles are the preferred firearm for euthanasia when it is necessary to shoot from a distance. Another reason a rifle is preferred is that a longer barrel may improve bullet performance.

Rifles are capable of delivering bullets at much higher muzzle velocities and energies and thus are not the ideal choice for euthanasia of animals in indoor or short-range conditions. General recommendations on rifle selection for use in euthanasia of cattle include .22, .223, .243, .270, .308, and others.<sup>124-126</sup> Results of at least 1 study<sup>126</sup> suggest that the .22 LR may not be the best selection of a firearm for euthanasia of adult cattle because of poor penetration, deflection, and fragmentation of the bullet. Standard- and high-velocity bullets fired from a .22 caliber rifle at a range of 25 m failed to penetrate skulls of steers and heifers studied. On the other hand, the .223 and .30-06 performed satisfactorily (eg, traversed the skull and caused sufficient brain damage to cause death) when fired from a distance of 25 m.<sup>126</sup> This is in agreement with similar information indicating that .22 Magnum or larger-caliber firearms provide higher muzzle energies and more consistent results when delivered to the proper anatomic site.<sup>125</sup>

When the most appropriate firearm is being chosen for the purpose of euthanasia, there are several factors to be considered, including caliber of the firearm, type of bullet or shotshell, distance from the target, age of the animal (aged animals have harder skulls), sex of the animal (bull or cow), and accuracy of aim. Based upon available information, if a .22 LR is to be used the following conditions apply: 1) the fire-

arm of choice is a rifle: 2) a solid-point bullet should be used, 3) it must be fired within close range of the skull (within 30 to 90 cm [1 to 3 feet]), and 4) the bullet must be directed so that proper anatomic placement on the skull is assured.<sup>127</sup>

**Shotguns**—Shotguns loaded with birdshot (lead or steel BBs) or slugs (solid lead projectiles specifically designed for shotguns) are appropriate from a distance of 1 to 2 yards (1 to 2 m). Although all shotguns are lethal at close range, the preferred gauges for euthanasia of cattle are 20, 16, or 12. Number 6 or larger birdshot or shotgun slugs are the best choices for euthanasia of cattle.<sup>124</sup> Birdshot begins to disperse as it leaves the end of the gun barrel; however, if the operator stays within short range of the intended anatomic site, the birdshot will strike the skull as a compact bolus or mass of BBs with ballistic characteristics on entry that are similar to a solid lead bullet. At close range, penetration of the skull is assured with massive destruction of brain tissue from the dispersion of birdshot into the brain that results in immediate loss of consciousness and rapid death.

The Canadian study<sup>126</sup> cited previously evaluated several firearms, including the .410 and 12-gauge shotguns. The .410 loaded with either number 4 or number 6 birdshot fired from a distance of 1 m was very effective and had the advantage of less recoil compared with other firearms used. The 12-gauge shotgun loaded with number 7 1/2 birdshot fired from a distance of 2 m from its target was effective but considered to be more powerful than necessary. Results of a 1-oz rifled slug fired from a 12-gauge shotgun at a distance of 25 m failed to penetrate the brain not because it lacked power, rather because of faulty shot placement. Researchers concluded that the rail sighting system on the shotgun was not sufficient for accurate shot placement if it was necessary to shoot from a distance. They also believed that recoil from this firearm would likely make it unpleasant to use if it were necessary to euthanize a large number of animals.<sup>126</sup>

One advantage of euthanasia using a shotgun is that when properly directed the birdshot will have sufficient energy to penetrate the skull but is unlikely to exit the skull. In the case of a free bullet or shotgun slug there is always the possibility of the bullet or slug exiting the skull, creating an injury risk for operators and observers. For operator and bystander safety, the muzzle of a shotgun (or any other firearm) should never be held directly against the animal's head. Discharge of the firearm results in development of enormous pressure within the barrel that can result in explosion of the barrel if the muzzle end is obstructed or blocked.

**PCB or NPCB**—Penetrating captive bolts are recommended for euthanasia of mature cattle in field situations. The use of NPCBs should be limited to calves. In large cattle NPCB is less effective than PCB.<sup>128,129</sup> Styles include in-line (cylindrical) and pistol grip (resembling a handgun) versions. Pneumatic

captive bolt guns (air powered) are limited to use in slaughter plant environments. Models using gunpowder charges are more often used in farm environments. They consist of a steel bolt and piston at 1 end, housed within a barrel. Upon firing, the rapid expansion of gas within the breech and barrel propels the piston forward driving the bolt through the muzzle. A series of cushions are strategically located within the barrel to dissipate excess energy of the bolt. Depending upon model, the bolt may be manually or automatically retracted. Accurate placement over the ideal anatomic site, energy (ie, bolt velocity), and depth of penetration of the bolt determine effectiveness of the device to cause a loss of consciousness and death. Bolt velocity is dependent on maintenance in particular, as well as cleaning and storage of the cartridge charges. Bolt velocities of 55 to 58 m/s are desirable for effective captive bolt use in packing plants.<sup>130-133</sup> Recommended minimum bolt velocities proposed for shooting bulls are as high as 70 m/s. In packing plants where bolt velocity is of particular concern, bolt velocity is routinely monitored to assure proper function of these devices.<sup>134</sup>

In general, captive bolt guns, whether penetrating or nonpenetrating, induce immediate loss of consciousness, but death is not always assured with the use of this device alone. In a study of 1,826 fed steers and heifers, 3 (0.16%) had signs of a return to sensibility or consciousness.<sup>129</sup> Results were similar in observations of 692 bulls and cows where 8 (1.2%) animals had signs consistent with a return to consciousness.<sup>129</sup> Failure to achieve a 100% loss of consciousness with no return to a conscious mental state was attributed to storage of the captive bolt charges in a damp location, poor maintenance of firing pins, inexperienced personnel operating the captive bolt (use of the incorrect anatomic site), misfires associated with a dirty trigger on the captive bolt, and use of the device on cows and bulls with thick, heavy skulls.<sup>129,135</sup>

At the present time, an adjunctive method such as exsanguination, pithing, or the IV injection of a saturated solution of potassium chloride is recommended to ensure death when PCB is used.<sup>127</sup> A newer version of PCB has emerged in recent years.<sup>125</sup> This device is equipped with an extended bolt with sufficient length and cartridge power to increase damage to the brain, including the brainstem. This device is being studied at the present time and may offer a euthanasia option with the PCB that does not require the need for an adjunctive method.

Captive bolt guns are attractive options for euthanasia because they offer a greater degree of safety to the operator and bystanders; but they should only be used by trained people. The muzzle should always be pointed toward the ground and away from the body or bystanders in case of accidental discharge. Protective gear for both ears and eyes is strongly recommended.

Unlike techniques described for gunshot, the



animal must be restrained for accurate placement of the captive bolt. And, unlike use of a firearm, proper use of the captive bolt requires that the muzzle of the device be held firmly against the animal's head. Once the animal is restrained, discharge of the captive bolt should occur with little or no delay so that animal distress is minimized. Adjunctive methods should be implemented as soon as the animal is rendered unconscious to avoid a possible return to sensibility. Thus, when conducting euthanasia by captive bolt, some preplanning and preparation improves the likelihood of a successful outcome.

Visual indicators that an animal has been rendered unconscious from captive bolt or gunshot include the following: immediate collapse; brief tetanic spasms followed by uncoordinated hind limb movements; immediate and sustained cessation of rhythmic breathing; lack of coordinated attempts to rise; absence of vocalization; glazed or glassy appearance to the eyes; and absence of eye reflexes.<sup>117</sup> Nervous system control of the blink or corneal reflex is located in the brainstem; therefore, the presence of a corneal reflex is highly suggestive that an animal is still conscious.

*Anatomic landmarks for use of the PCB and gunshot*—In cattle, the point of entry of the projectile should be at the intersection of 2 imaginary lines, each drawn from the outside corner of the eye to the center of the base of the opposite horn, or an equivalent position in polled animals (**Figure IIA**).<sup>136</sup> In long-faced cattle or young stock, a point on the midline of the face that is halfway between the top of the poll and an imaginary line connecting the outside corners of the eyes can be used (**Figure IIB**). Proper positioning of the firearm or PCB is necessary to achieve the desired results.

*Euthanasia of bison*—Proper handling of bison requires an understanding and respect for the wild nature of these animals. Handlers should strive to minimize stress by moving animals slowly utilizing techniques similar to those applied in low-stress handling of cattle. Restraint requires specialized handling equipment designed to accommodate bison body conformation.

The recommended method for the euthanasia of a bison is gunshot. A minimum of 1,356 J (1,000 foot-lb) of muzzle energy is required for euthanasia of yearlings, cows, and mature bulls. This limits the firearm options to higher-caliber centerfire rifles (eg, 30-30, 270, 30-06, and others). The majority of handguns produce muzzle energies well below 1,356 J (1,000 foot-lb) and would not be appropriate for euthanasia of mature bison.<sup>137</sup>

The preferred anatomic site for entry of a bullet is on the forehead approximately 2.5 cm (1 inch) above an imaginary line connecting the bottom of the horns (**Figure 12**), which places the shot in a similar location to recommendations for mature cattle. Ideally, the angle of entry should be perpendicular to the skull. If it is necessary to shoot the animal from a dis-

tance, targets may be the head (frontal or lateral side) or the thorax (heart shot).<sup>137</sup>

*Euthanasia of water buffalo*—There are important anatomic differences that need to be considered when determining the best method of euthanasia for water buffalo, compared with cattle. Skull bones are substantially thicker and the frontal and paranasal sinuses noticeably wider in buffalo, compared with cattle. Moreover, measures of the median distance from the frontal skin surface to the thalamus were 144.8 mm (117.1 to 172.0 mm) vs 102.0 (101.0 to 121.0 mm) in water buffalo and cattle, respectively.<sup>138</sup> Bolt length of conventional captive bolt devices is 9 to 12 cm (3.5 to 4.7 inches), meaning that the ability of the bolt to make direct contact with the thalamus and brainstem is less likely using frontal sites in water buffalo, compared with cattle. For this reason, use of the PCB at frontal sites in water buffalo is generally less effective.

Considering the thicker skin and skull encountered with water buffalo, the use of a high-caliber firearm is the preferred method of euthanasia under field conditions. In the study by Scwenk et al,<sup>138</sup> the frontal point of entry for captive bolt guns was chosen as the intersection of 2 imaginary lines connecting the lower edge to the upper edge of the contralateral horn (**Figure 13**). This site would appear to be similar to sites described in the guidelines for domestic cattle.

Depth of concussion was evaluated in 30 water buffalo shot at the poll (described as the back of the head) with a PCB.<sup>139</sup> Prevalence of a shallow depth of concussion was observed in 53% of animals. In 2 of the animals studied, the bolt missed the brain completely and entered the spinal cord. In 1 case, the bolt failed to penetrate into the brain. On postmortem examination of the brain, 79% of animals were shot in the midbrain or brainstem. One animal, an older bull, was shot in the frontal position but failed to collapse. On postmortem examination, researchers confirmed that the bolt never penetrated into the cranial cavity of this animal. Three animals shot in the crown position (ie, the top of the head—sometimes referred to as the poll) immediately collapsed, but 2 resumed breathing shortly before ejection from the stunning pen and had to be reshot. Researchers concluded that poll position stunning could be effective in water buffalo, but accurate placement of the PCB was important to prevent misdirection into the spinal cord, and animals need to be exsanguinated soon after they have lost consciousness.

### S3.2.1.3 Adjunctive methods

#### S3.2.1.3.1 Noninhaled agents

*Potassium chloride and magnesium sulfate*—Bolusing saturated solutions of salt through the heart disrupts electrical conductivity in heart muscle, resulting in fibrillation and heart failure. Animals must be unconscious before administration of potassium chloride or magnesium sulfate. While not acceptable as a sole method of euthanasia, rapid IV injection of

potassium chloride may assist in ensuring death after cattle have been rendered unconscious by PCB, gunshot, or administration of general anesthetics ( $\alpha_2$ -adrenergic agents such as xylazine alone are insufficient; see comments under Unacceptable methods). Normally, injection of 120 to 250 mL of a saturated solution of potassium chloride is sufficient to cause death; however, the potassium chloride solution should be administered until death is assured. When conducting euthanasia of cattle that may require subsequent administration of potassium chloride, the operator should prepare at least 3 to four 60-mL syringes of solution (equipped with 14- or 16-gauge needles) in advance. This will facilitate rapid administration and ensure the animal does not regain consciousness. Any available vein may be used; however, it is important to position oneself out of the reach of limbs and hooves that may cause injury during periods of involuntary movement. In most cases, it is safest to kneel down near the animal's back and close to the animal's head where one can reach over the neck to administer the injection into the jugular vein. Once the needle is in the vein, the injection should be delivered rapidly.

Magnesium sulfate may be administered similarly to potassium chloride. Death may not occur as rapidly, but similar to administration of potassium chloride, residue risks for predators and scavengers are low (see Noninhaled Agents).

#### S3.2.1.3.2 Physical methods

*Second shot*—Although 1 well-placed bullet or shot from a PCB usually results in immediate loss of consciousness with little likelihood of return to consciousness, one should always be prepared to deliver a second or even a third shot if necessary. The additional injury to brain tissue along with increased hemorrhage and edema creates substantial intracranial pressure. Compression resulting from this increase in pressure interrupts centers in the brain that control respiratory and cardiac functions and leads to death.

*Exsanguination*—Exsanguination may be performed as an adjunctive measure to ensure death when necessary in an unconscious animal. Exsanguination is usually accomplished via an incision of the ventral aspect of the throat or neck transecting skin, muscle, trachea, esophagus, carotid arteries, jugular veins, and a multitude of sensory and motor nerves and other vessels. This procedure is not recommended as a sole method of euthanasia; rather it is reserved for use as an adjunctive method to ensure death since information in the literature is inconsistent as to length of time between the neck cut and loss of consciousness. Some studies<sup>140,141</sup> demonstrate a rapid loss of brain activity (measured by EEG) with little variation between individual animals. In contrast, direct observation of time to collapse and EEG data indicate that the time from ventral-neck incision to unconsciousness is variable and may be quite prolonged in animals killed by exsanguination.<sup>142-146</sup>

The uncertainty of time from the neck incision to loss of consciousness raises obvious questions: Does the animal feel pain during the neck cut? Does the drop in blood pressure cause discomfort or distress? Opinions on these questions remain divided. Some hold the view that when the knife (*sakin* in Hebrew) is of appropriate size, exceptionally sharp, completely free of blemishes or imperfections, and used in such manner as to create a rapid clean incision (such as performed by a *shochet*), exsanguination is relatively painless.<sup>147</sup> Others contend that tissues of the neck are well innervated with nociceptive nerve fibers such that transection leads to significant pain and distress sufficient to cause shock at the time of incision.<sup>148-150</sup>

In recognition that this issue remains controversial and that people conducting these procedures for the purposes of euthanasia are not likely to have a *sakin* or the skills of a *shochet*, the recommendation is that exsanguination only be used in unconscious animals as an adjunctive method to assure death. It should be performed with a pointed, very sharp knife with a rigid blade at least 15 cm (6 inches) long and conducted as soon as the loss of consciousness is confirmed.

Exsanguination can be disturbing to observe due to the large volume of blood loss; this also raises biosecurity concerns. When only the carotid arteries and jugular veins are cut, bleeding may persist at variable rates for several minutes. Severing these vessels closer to the thoracic inlet where the vessels are larger will increase blood flow rate. Some evidence suggests that restricted blood flow may be caused by the formation of false aneurysms in the severed ends of arteries in cattle.<sup>146</sup>

*Pithing*—Pithing is a technique designed to cause death by increasing destruction of brain and spinal cord tissue. It is performed by inserting a pithing rod through the entry site produced in the skull by a bullet or PCB. The operator manipulates the pithing tool to destroy brainstem and spinal cord tissue to ensure death (see Physical Methods). Muscular activity during the pithing process is often quite violent, but is followed by quiescence that facilitates exsanguination or other procedures.<sup>151</sup>

#### S3.2.1.4 Special cases and exceptions

In emergency situations, it may be difficult or impossible to safely restrain a dangerous animal for IV injection, and administration of a sedative to allow restraint might not be desirable because of the possibility that the animal could injure itself or bystanders before the sedative could take effect. In such cases, a neuromuscular blocking agent (eg, succinylcholine) may be administered IM, but the bovid must be euthanized via an appropriate method as soon as it can be controlled. Use of succinylcholine alone or without prior anesthesia is not acceptable for euthanasia.

Use of the poll (bony protuberance on the top of the skull) for application of the PCB in abattoirs is not allowed by regulations in the European Union

because the depth of concussion in this region is less than that observed in frontal sites.<sup>152</sup> Conversely, for large bulls and water buffalo, use of the frontal site for administration of a captive bolt is not always effective because of the thickness of the hide and skull in this region. Use of the poll position can be effective if the appropriate captive bolt gun is used and when the muzzle is directed so that the discharged bolt will enter the brain.<sup>152</sup> But in most cases the poll position is not preferred. Research has demonstrated that use of PCB at the poll is prone to operator error and misdirection of the bolt into the spinal cord instead of the brain.<sup>152</sup> More animals were not properly rendered unconscious (ie, depth of concussion was shallow) using the poll position as compared with frontal sites. Additionally, in some emergency situations, when the face is not safely accessible, a shot directed from just behind the poll and aimed toward the base of the tongue may be employed. This positioning should not be routine.

Placement of the captive bolt is critical to ensure that the bolt enters the brain and not the spinal cord. Shots from the poll should be directed toward the base of the tongue unless brainstem tissues are needed for diagnostic reasons. Whether poll shooting is conducted by PCB or gunshot, there is substantial potential for misdirection of the bullet or bolt so that damage to the brain to achieve unconsciousness or death is not assured. This will result in delays in loss of consciousness and a greater likelihood of variable periods of extreme distress.

### S3.2.2 SMALL RUMINANTS

Euthanasia of small ruminants may be necessary for reasons ranging from traumatic injury to incurable disease. Methods include barbiturate overdose, gunshot, or captive bolt followed by an adjunctive method such as exsanguination, IV administration of potassium chloride or magnesium sulfate, or pithing. Electrocutation is another option, but this method requires specialized equipment to restrain the animal for proper placement of the electrodes. Because electricity and the necessary equipment are unlikely to be available for euthanasia under field conditions, electrocutation is not considered to be practical for routine use.

#### S3.2.2.1 Acceptable methods

##### S3.2.2.1.1 Noninhaled agents

*Barbiturates and barbituric acid derivatives*—Barbiturates act by depression of the CNS, which progresses from a state of consciousness to unconsciousness, deep anesthesia, and eventually death. Although use of these agents requires restraint and involves mild discomfort (ie, needle placement) for administration, observers generally find this a more acceptable method of euthanasia because death comes about more peacefully. In the companion animal setting, these attributes are highly desirable. In production settings, concerns for cost and disposal of animal remains make this method a less attractive euthanasia option.

#### S3.2.2.2 Acceptable with conditions methods

##### S3.2.2.1.1 Inhaled agents

Carbon dioxide inhalation as a form of euthanasia has been evaluated in young goat kids (< 3 weeks of age). Aversion testing suggests that concentrations below 70% CO<sub>2</sub> are not aversive to goat kids, as they were willing to freely enter a test chamber containing up to 70% concentration to receive a milk meal. All kids entering the chamber of 70% CO<sub>2</sub> lost consciousness while consuming the meal. Based on these data and clinical experience it is recommended that once kids are placed in a euthanasia chamber it should be filled at a rate sufficient to achieve a CO<sub>2</sub> concentration of > 70% by 5 minutes and to use a dwell time of 10 minutes to assure euthanasia. Euthanasia by CO<sub>2</sub> inhalation has not been evaluated in older goats or sheep. Given that aversion to CO<sub>2</sub> is variable by species and that physiologic differences in age and weight could affect success, the suitability of this form of euthanasia in other ruminant species warrants further investigation but cannot currently be recommended due to a lack of knowledge.<sup>153,154</sup>

##### S3.2.2.2.2 Physical methods

*Gunshot*—Firearms recommended for euthanasia of adult small ruminants include the .22 LR rifle; .38 Special, .357 Magnum, and 9 mm or equivalent handguns; and shotguns. Some prefer hollow-point bullets to increase brain destruction and reduce the chance of ricochet. However, operators are reminded that bullet fragmentation may substantially reduce the potential for brain destruction because of reduced penetration, particularly when used in large-horned adult rams. Shotguns or higher-caliber firearms loaded with solid-point bullets are preferred in these conditions. When firearms are used for euthanasia it is important that the gun never be held flush with the skull. Instead, the muzzle of the gun should be aimed in the desired direction and held no closer than 6 to 12 inches from the target.

*PCB and NPCB*—Effective application of the captive bolt in sheep and goats is indicated by immediate loss of consciousness lasting until death by exsanguination or another adjunctive method. While it is presumed that penetration of the bolt causes insensibility, research into the determinants of effective captive bolt use indicates that the impact of the bolt on the cranium is a principal contributor to the loss of consciousness.<sup>131</sup> The use of concussive methods (NPCB) has been determined to be an effective means of inducing insensibility in neonatal goats and kids that will persist until death caused by exsanguination.<sup>132</sup>

*Anatomic landmarks for gunshot and captive bolts*—The location for placement of a captive bolt or entry of a free bullet for euthanasia is similar for both sheep and goats. The optimal site is on the intersection of 2 lines, each of which is drawn from the lateral canthus of one eye to the middle of the base of the opposite ear (**Figures 14AB, 15AB**).<sup>155,156</sup> Alternative landmarks that provide a very similar placement use the dorsal midline of the head at the level of the

external occipital protuberance aiming downward toward the cranialmost portion of the intermandibular space.<sup>157</sup> Frontal shots, aiming at the foramen magnum, should be reserved for use only with gunshot and provide an alternate approach for heavily horned sheep and goats where the top of the skull may be too hard to access due to the horns. The large and variable sinus cavity of sheep and goats makes frontal shots with a captive bolt more inconsistent.<sup>136</sup>

**Camelids**—The effectiveness of PCB was studied in 96 alpacas. Incorrect placement of the captive bolt resulted in incomplete concussion and the failure of 10 animals to be rendered insensitive. Researchers evaluated 2 anatomic sites: a frontal and a crown site. The frontal site was defined as on the intersection of 2 lines drawn from the medial canthus of each eye to the opposite ear while aiming the PCB at the brainstem. This site proved to be less effective because animals would move their head as the PCB entered their field of view immediately prior to the shot. Placement of the PCB at the crown position (ie, highest point on the head) aiming downward to the base of the jaw (**Figure 16**) was more likely to result in an immediate loss of consciousness and cause damage to the thalamus and brainstem. While both landmarks are considered acceptable for captive bolt placement, if the frontal site is used increased restraint of the animal may be required to prevent movement that would result in incorrect placement.

**Cervids**—For euthanasia of captive farmed cervids, several options exist. For animals accustomed to being worked through drop chutes, the animals can be restrained in a drop chute and shot with a captive bolt. For deer without antlers, the proper site for entry of a bolt from a PCB is the same as that described for goats and sheep previously—on the intersection of 2 lines drawn from the lateral canthus to the base or top of the opposite ear. For antlered deer (bucks), a frontal site may be necessary, but may require a longer bolt length. The frontal site may be determined as on the intersection of 2 lines drawn from the lateral canthus of each eye to the top of the base of the ear or base of the antler (**Figure 17AB**). When drop chutes are not available or when the animals are not accustomed to being restrained in the chute, it may be beneficial to consider darting the animal with an anesthetic followed by use of a captive bolt or firearm at the sites discussed previously. When immobilization is feasible, it ensures accurate shot placement and minimizes the risk of a prolonged euthanasia. Immobilized animals (either chemically immobilized or immobilized from injury such as being hit by a car) should always be euthanized with a PCB or firearm via the sites discussed above. Shooting in the thorax or so-called center mass should be avoided. In situations where the ability to sufficiently immobilize fractious animals is not available or immobilization poses a significant risk to human health, killing by trained shooters using specialized equipment can be highly effective.

### S3.2.2.3 Adjunctive methods

#### S3.2.2.3.1 Noninhaled agents

**Potassium chloride and magnesium sulfate**—Although not acceptable as a sole method of euthanasia, the rapid IV injection of potassium chloride is an effective method to ensure death in sheep and goats previously rendered unconscious by penetrating or NPCB, gunshot, or administration of anesthetics. When conducting euthanasia of sheep and goats that may require subsequent administration of potassium chloride, the operator should prepare at least 1 or two 30-mL syringes of solution (equipped with an 18-gauge needle) in advance. This will facilitate rapid administration and ensure the animal does not regain consciousness. Any available vein may be used; however, it is important to position oneself out of the reach of limbs and hooves that may cause injury during periods of involuntary movement. Once the needle is in the vein, the injection should be delivered rapidly.

Magnesium sulfate may be administered similarly to potassium chloride. Death may not occur as rapidly, but similar to administration of potassium chloride, residue risks for predators and scavengers are low (see Noninhaled Agents).

#### S3.2.2.3.2 Physical methods

**Second shot**—Although 1 well-placed bullet or shot from a PCB usually results in immediate loss of consciousness with little likelihood of return to consciousness, one should always be prepared to deliver a second or even a third shot if necessary. The additional injury to brain tissue along with increased hemorrhage and edema creates sufficient intracranial pressure to cause death in most cases, but damage to the brainstem should always be the objective in euthanasia.

**Exsanguination**—Exsanguination may be performed as an adjunctive step to ensure death when necessary in small ruminants. It may be accomplished via an incision of the ventral aspect of the throat or neck transecting skin, muscle, trachea, esophagus, carotid arteries, and jugular veins. Exsanguination should be performed with a pointed, very sharp knife with a rigid blade at least 15 cm (6 inches) long.

Exsanguination can be disturbing for bystanders because of the large volume of blood loss, which also raises biosecurity concerns. When only the carotid arteries and jugular veins are cut, bleeding may persist at variable rates for several minutes. Severing these vessels closer to the thoracic inlet where the vessels are larger will increase blood flow rate.

**Pithing**—Pithing is a technique designed to cause death by increasing destruction of brain and spinal cord tissue. It is performed by inserting a pithing rod through the entry site produced in the skull by a bullet or PCB. The operator manipulates the pithing tool to destroy brainstem and spinal cord tissue to ensure death (see Physical Methods). Muscular activity during the pithing process is often quite violent, but is followed by quiescence that facilitates exsanguination or other procedures.<sup>151</sup>

### S3.2.3 UNACCEPTABLE METHODS

The following methods are unacceptable for euthanasia of cattle and small ruminants: manually applied blunt trauma to the head; injection of chemical agents into conscious animals (eg, disinfectants, electrolytes such as potassium chloride and magnesium sulfate, nonanesthetic pharmaceutical agents); administration of xylazine or any other  $\alpha_2$ -adrenergic receptor agonist followed by IV potassium chloride or magnesium sulfate (although large doses of  $\alpha_2$ -adrenergic receptor agonists can produce a state resembling general anesthesia, they are recognized as being unreliable for that purpose<sup>158</sup>), drowning, or air embolism (ie, injection of air into the vasculature); and electrocution with 120 V, drowning, and exsanguination in conscious animals.

Camelids, specifically alpacas and llamas, are kept primarily for fiber production and as pets. In South America, domestic camelids are maintained for food and as pack animals. Camelids are slaughtered by the method of puntilla, which involves inserting a knife into the back of the neck to sever the spinal cord. This immobilizes the animal, making exsanguination procedures safer<sup>154</sup>; however, research in llamas and cattle indicates that the stab is often ineffective in causing insensibility.<sup>159,160</sup> Observations in 20 llamas killed by puntilla found that repeated stabbing was necessary to penetrate the foramen ovale; all animals exhibited rhythmic breathing and 95% had positive palpebral reflexes.<sup>159</sup> Because of the inconsistency of the puntilla method, it cannot be recommended as an acceptable method of euthanasia of small ruminants or cattle.

### S3.2.4 NEONATES

*Neonatal calves, lambs, and kids*—Neonatal calves present special challenges for euthanasia. Methods include barbiturate overdose, gunshot, and captive bolt (penetrating or nonpenetrating) with an adjunctive method applied to ensure death. Manually applied blunt force trauma to the head is not acceptable for calves because their skulls are too hard to achieve immediate destruction of brain tissue leading to unconsciousness and death. In lambs and kids, manually applied blunt force trauma is performed by manual impact of the head by swinging the animal against a hard surface or hitting the animal with a hard object such as a hammer. Both methods are difficult if not impossible to apply consistently and therefore are listed as unacceptable.

Use of a penetrating or purpose-built NPCB (controlled blunt force trauma) is acceptable with conditions for calves, lambs, and kids. Controlled blunt force trauma differs from manually applied blunt force trauma because captive bolts deliver an appropriate and uniform amount of force each time they are fired, and structural brain damage is more consistent. Studies<sup>161</sup> using controlled blunt force trauma methods found that focal as well as diffuse injury caused by penetrating and NPCB pistols was similar

and sufficient for both to be considered as effective for euthanasia of lambs. Based on electrophysiologic evidence,<sup>131</sup> researchers determined that the primary determinant of effective shooting is the impact of the bolt and not penetration of the bolt into brain tissues. In contrast, 1 report<sup>162</sup> credits structural changes including focal damage adjacent to the wound track and damage to peripheral tissues of the cerebrum, cerebellum, and brainstem as the predominant factors affecting the loss of respiratory function and consciousness.

Controlled blunt force trauma using an NPCB applies a consistent degree of force and has been determined to cause immediate insensibility in neonatal calves,<sup>154</sup> lambs,<sup>163</sup> and kids.<sup>164,165</sup> The preferred anatomic site in calves is similar to that described for mature cattle. The preferred shooting position for neonatal lambs and kids is to place the muzzle of the NPCB on the midline behind the poll (ie, between the ears) with the chin tucked into the neck (**Figure 18**).<sup>164,165</sup> In the study by Sutherland et al,<sup>164</sup> a propane-powered NPCB capable of delivering 27.8 J of energy was used as the euthanasia device. In the studies by Grist et al,<sup>163,165</sup> researchers used the Accles and Shelvoke CASH Small Animal Killer (CPK 200) powered by a 1- or 1.25-grain cartridge.

Barbiturate overdose may be used for euthanasia of neonatal calves, lambs, and kids. In noncommercial situations, this method may be preferred over physical methods. Drawbacks include temporary animal distress associated with restraint and needle placement, challenges associated with disposal of remains (residue concerns), and the requirement that only personnel registered with the US DEA may perform the procedure. Assuming these conditions can be met, barbiturate overdose is generally less objectionable to owners and observers than other methods.

### S3.2.5 DAMS AND FETUSES

Prerequisites for the sensation of pain, distress, or pleasurable experiences are sentience and consciousness. Both are necessary for animals to experience either positive or negative states. Behavioral and EEG evidence indicates that mammalian fetuses are insentient and unconscious throughout the first 75% to 80% of gestation.<sup>23</sup> As neuronal pathways between the cerebral cortex and thalamus become better established, the fetus develops the capacity for sentience. However, while maintained within the protected environment of the animal's uterus it remains in an unconscious state due to the presence of 8 or more neuroinhibitors that act on the cerebral cortex of the fetus to maintain it in the sleep-like state of unconsciousness. At birth, the combined effects of reduced neuroinhibition and onset of neuroactivation contribute to gradual arousal of the mammalian newborn into a state of consciousness that occurs within minutes to several hours after birth.<sup>23</sup>

These observations indicate that the fetus does not suffer as if drowning in amniotic fluid when the

dam is euthanized; nor is it likely to experience pain associated with other types of invasive procedures in utero. These studies also support the rationale for international guidelines on the handling of fetuses suggesting that fetuses should not be removed from the uterus before the EEG is most likely to be isoelectric. For example, when animals are euthanized by physical methods that include exsanguination, delaying removal of the fetus from the uterus for a minimum of 5 minutes after hemorrhaging has ceased generally assures a substantial amount of anoxia-induced damage to the cerebral cortex that will normally prevent progression toward a return to sensibility.<sup>166</sup> If there is any doubt as to the fetus's level of consciousness, it should be euthanized immediately by captive bolt and adjunctive methods as appropriate.

It also addresses the welfare concerns of those who fear that the collection of tissues (in particular, fetal calf blood by intracardiac puncture) from live fetuses in the immediate postslaughter period creates undue suffering. Although the heart may continue to beat (which is necessary for the successful collection of fetal blood), in the absence of breathing there is little likelihood of return to a state of consciousness.<sup>166</sup> Breathing can be prevented by clamping off the fetus's trachea or by delaying its removal from the uterus for 15 to 20 minutes after death of the dam.<sup>166</sup> These are by no means insignificant concerns as there is high demand for fetal tissues to support laboratory research. A 2002 report<sup>167</sup> suggests that world demand for fetal calf serum was 500,000 L/y and growing, a need that would require the harvest of at least 1,000,000 fetuses/y.

The information derived from these observations also has application for fetal rescue situations that may involve euthanasia of late-term pregnant dams by physical methods. The reason one might attempt this is to avoid remains-disposal complications from drug residues as would occur if the fetus were to be delivered by caesarian section using standard surgical methods. Although respiration is interrupted, the heart continues to beat in animals rendered unconscious using physical methods. Therefore, it may be possible to rescue a fetus from an unconscious dam by caesarian section if the procedure can be performed before the fetus suffers irreversible effects of anoxia. Once the fetus is successfully delivered, euthanasia of the dam may be confirmed via any of the previously described adjunctive methods. It is important to understand that there are significant risks to fetal welfare if rescue is attempted. Welfare complications associated with fetal rescue attempts would include impaired brain function caused by anoxia occurring during the rescue attempt, compromised respiratory function and body heat production resulting from fetal immaturity, and greater risk of infection as a consequence of failure of passive transfer of immunity.<sup>23,168,169</sup> When the value of the fetus justifies the effort to secure a successful live delivery, the preferred approach to assure fetal health

and welfare is by caesarian section using standard surgical procedures.

*Barbiturates and barbituric acid derivatives*—Pentobarbital readily crosses the placenta resulting in fetal depression in pregnant animals. However, death of the dam normally precedes the death of the fetus. In 1 study<sup>170</sup> cardiac arrest in lambs was delayed for as long as 25 minutes beyond the death of the dam. Similar observations in mice demonstrated that death of the fetuses could only be achieved by the use of doses well in excess of those normally required for euthanasia.<sup>171</sup> Based on these observations, one could offer a similar recommendation to that provided previously for death by exsanguination whereby fetuses should be retained within the uterus for at least 15 to 20 minutes after maternal death has occurred to prevent the delivery of viable fetuses.

### **S3.3 SWINE**

Methods of euthanasia commonly applied to swine include CO<sub>2</sub>, gunshot, captive bolt, overdose of an anesthetic administered by a veterinarian, electrocution, and blunt force trauma (suckling piglets only). Gas mixtures of N<sub>2</sub>O, Ar, N<sub>2</sub>, and CO<sub>2</sub> may also be used but are not currently commonly applied in the field. Selection of the most appropriate method for each situation is dependent upon size and weight of the animal, availability of equipment and facilities, operator skill and experience with the procedure, aesthetic concerns, human safety, and options for disposal of remains. Certain physical methods of euthanasia may require adjunctive methods such as exsanguination or pithing to ensure death. A brief description of each method and appropriate candidates for it are described. Detailed information on inhaled, noninhaled, and physical methods of euthanasia may be found in the respective sections of this document.

#### **S3.3.1 SOWS, BOARS, AND GROWER-FINISHER PIGS**

Methods usually used for euthanasia of sows, boars, and grower-finisher pigs include gunshot, PCB, electrocution, and barbiturate overdose.

Use of physical methods of euthanasia requires direct contact with the animal, and therefore restraint is necessary. Use of a snare is the most common form of restraint for this class of swine. Studies<sup>172-179</sup> demonstrate varying degrees of stress associated with restraint by snaring techniques. To minimize stress associated with snaring, personnel conducting euthanasia of swine are advised to make advance preparations (eg, prepare the site, load the gun or captive bolt) so that the time during which the animal must be restrained is minimized.

##### **S3.3.1.1 Acceptable methods**

###### **S3.3.1.1.1 Noninhaled agents**

*Barbiturates and barbituric acid derivatives*—Mature sows, boars, and grower-finisher pigs may be euthanized by IV administration of euthanasia solutions containing barbiturates.<sup>180</sup> A dosage of 1 mL/5

kg (0.45 mL/2.3 lb) up to 30 kg (66 lb), then 1 mL/10 kg (0.45 mL/4.5 lb) thereafter, has been recommended.<sup>181</sup> This method may not cause death if not administered IV. Other anesthetics (gas and/or injectable) may be used to induce unconsciousness, followed by an adjunctive method such as exsanguination. These are not commonly used in field conditions, but may be applicable in some settings. Because these drugs are controlled substances they must be administered by personnel who are registered with the US DEA. Strict record keeping is required of all who use and store these drugs.

Some may find euthanasia by the IV administration of an anesthetic less aesthetically displeasing than gunshot, captive bolt, or electrocution. Options for disposal of animals euthanized with barbiturates are complicated by concerns for residues that create risks for scavengers and other domesticated animals that may consume portions of the animal's remains, and renderers may not accept animal remains contaminated with barbiturate residues.

### S3.3.1.2 Acceptable with conditions methods

#### S3.3.1.2.1 Inhaled agents

*Carbon dioxide, nitrogen, nitrous oxide, and argon*—Studied gas mixtures include N<sub>2</sub> with CO<sub>2</sub>; Ar, alone and with CO<sub>2</sub>; and CO. Inhaled agents are most commonly used as a method of euthanasia in packing plant venues, and are considered to be acceptable with conditions. However, they are typically not practical in farm situations, and have greater application for pigs weighing 70 lb (31.8 kg) or less, rather than grower-finisher pigs or sows and boars. Gas combinations (eg, Ar and CO<sub>2</sub>, N<sub>2</sub>O and CO<sub>2</sub>) have been shown to be effective alternatives to CO<sub>2</sub> alone. When the concentration of CO<sub>2</sub> is high, adequate duration of exposure ensures unconsciousness is followed by death. These methods are described in greater detail for the euthanasia of nursery pigs and in the section on Inhaled Agents.

#### S3.3.1.2.2 Physical methods

*Gunshot*—Gunshot is commonly used for euthanasia of growing and adult swine. When properly conducted using the appropriate firearm, euthanasia by gunshot produces immediate loss of consciousness and rapid death. There are 3 possible sites for conducting euthanasia in swine: frontal, temporal and from behind the ear toward the opposite eye (**Figure 19AB**). The frontal site is in the center of the forehead slightly above a line drawn between the eyes. The projectile should be directed toward the spinal canal. The temporal site is slightly anterior and below the ear. Specific sites may vary slightly according to breed.<sup>124,182,183</sup>

Because of the thickness of the pig's skull, muzzle energies of 400 N-m (300 feet-lb) or more are required for euthanasia of adult sows, boars, and growing-finishing pigs. When the alternate site behind the ear is chosen, a .22 caliber firearm loaded with a solid-point bullet may be used. Wadcutters and fragmenting bullets should not be used for euthanasia of

swine. Potential for ricochet is reduced when euthanasia by gunshot can be conducted outdoors where bullets that pass through the animal may be captured in an earthen surface. Shotguns may be used at short range and offer the advantage of less potential for bullet ricochet. Twelve-, 16-, or 20-gauge shotguns are recommended for mature pigs. The muzzle should never be held flush to the skull. When performed correctly, the pig drops to the floor immediately, exhibiting varying amounts of tonic and clonic muscle movements. Confirmation that the animal has been rendered insensible includes observing that rhythmic breathing has stopped and that righting reflex is absent, vocalization is absent, and no palpebral reflexes or responses to noxious stimuli are present. All pigs should be observed for evidence of these responses until death has been confirmed.

Gunshot is an effective, low-cost method of euthanasia when properly performed. Firearms are readily available in most areas. Human safety is the primary concern with the use of gunshot for euthanasia. Proper training on firearm safety and use is imperative and gunshot should only be performed by personnel who have had appropriate training.

*PCB*—Use of well-maintained PCB guns with ammunition appropriately selected for the size of the animal is acceptable with conditions as a method of euthanasia for growing and adult swine.<sup>184,185</sup> Proper application of the PCB requires restraint of the animal because the device must be held firmly against the forehead over the site described for gunshot (**Figure 19A**). When performed correctly, the pig drops to the floor immediately, exhibiting varying amounts of tonic and clonic muscle movements. Confirmation that the animal has been rendered insensible includes observation of the following: rhythmic breathing stops, no righting reflex is observed, vocalization is absent, and no palpebral reflexes or responses to noxious stimuli are present. All pigs should be observed for evidence of these responses until death has been confirmed.

Death following use of the PCB is commonly achieved, but is not assured depending upon bolt length and depth of the frontal sinus in mature sows and boars. Therefore, secondary steps to ensure death (eg, a second application of the PCB, exsanguination, pithing) should be applied as necessary. Breed differences result in variable skull shapes making determination of the best anatomic site for conducting euthanasia in mature sows and boars difficult.<sup>182</sup>

Penetrating captive bolts offer safety advantages compared with firearms. Properly applied, the method is very effective and costs associated with its use are minimal. However, it is important that PCB guns be maintained regularly (cleaning and replacement of worn parts) and that charges be stored properly to ensure appropriate bolt velocity. Bolt length and ammunition requirements for effective single-step euthanasia vary for different sizes and maturities of pigs. Using a captive bolt of insufficient length or

insufficient charge reduces effectiveness. Personnel must be trained in the proper use of PCBs to ensure effective euthanasia.

**Electrocution**—Electrocution as a sole method of euthanasia can achieve death via 2-step or single-step processes.<sup>186-195</sup> Electrical current must pass through the brain to achieve loss of consciousness, but then must cross the heart to cause fibrillation and cardiac arrest. As a 2-step process, electrode placements are head-head, followed by head to flank, for the appropriate time. For a single-step process for euthanasia, head to opposite flank is an example of appropriate placement.

Head-only electrocution induces a grand mal seizure and immediate unconsciousness, but death does not occur unless followed by head-to-heart electrocution or the application of an adjunctive method to ensure death such as exsanguination.<sup>187,196</sup> The secondary step, whether head-to-heart electrocution or another method, must be performed within 15 seconds of onset of unconsciousness; otherwise, the animal may regain consciousness. Head-only electrocution is performed by placement of the electrodes in 1 of 3 positions: between the eyes and base of the ears on either side of the head; below the base of the ears on either side of the head; or diagonally, below 1 ear to above the opposite eye. Placement of electrodes for head-to-heart electrocution is on the head in front of the brain (some use the base of the ear) with a secondary electrode attached to the body behind the heart on the opposite side. This assures diagonal movement of current through the animal's body. With specific electrode placement, current of 110 V at a minimum frequency of 60 Hz applied for a minimum of 3 seconds is sufficient for euthanasia of pigs up to 125 kg.<sup>197</sup> Systems used for electrocution must be capable of meeting minimum current requirements to ensure insensibility in the head-only method, and insensibility and cardiac fibrillation in the head-heart method.

Electrocution is effective as a single-step process with appropriate tong or clamp placement. However, proper training and special equipment must be used to ensure adequate and safe euthanasia. While electrocution is commonly used to render animals insensible in packing plants and safety precautions in that environment are routine, for implementation on-farm where use of the method is less common, extra precautions may need to be taken to ensure human safety. Agonal gasping may be evident after current is withdrawn and may be aesthetically unacceptable for observers and operators.

#### S3.3.1.3 Adjunctive methods

**Exsanguination**—While not appropriate as a sole method of euthanasia, exsanguination may be performed as a secondary step to ensure death when necessary.

**Pithing**—While not appropriate as a sole method of euthanasia, pithing may be performed as a secondary step to ensure death when necessary.

More information about these methods is available in the Physical Methods section of the Guidelines.

### S3.3.2 NURSERY PIGS (70 LB OR LIGHTER)

Nursery pigs may be euthanized by use of inhaled gases (eg CO<sub>2</sub>, N<sub>2</sub>O, Ar, N<sub>2</sub>), gunshot, PCB, NPCB, electrocution, or anesthetic overdose. Descriptions of the use of CO<sub>2</sub> and NPCB for euthanasia of young pigs follow. For details on other methods please see the preceding information in this section or the Physical Methods section of the Guidelines.

#### S3.3.2.1 Acceptable methods

##### S3.3.2.1.1 Noninhaled agents

**Barbiturates and barbituric acid derivatives**—Nursery pigs may be euthanized by IV administration of euthanasia solutions containing barbiturates. Because these drugs are controlled substances they must be administered by personnel who are registered with the US DEA. Strict record keeping is required of all who use and store these drugs.

Many find euthanasia by the IV administration of an anesthetic less aesthetically displeasing than administration of CO<sub>2</sub>, captive bolt, or electrocution. Options for disposal of animals euthanized with barbiturates are complicated by concerns for residues that create risks for scavengers and other domesticated animals that may consume portions of the animal's remains.

#### S3.3.2.2 Acceptable with conditions methods

##### S3.3.2.2.1 Inhaled agents

**Carbon dioxide**—Carbon dioxide alone or in combination with N<sub>2</sub>O or Ar has been used successfully for euthanasia.<sup>198-202,c</sup> Properly applied, inhalation of CO<sub>2</sub> is an effective method of euthanasia. On the other hand, if air exchange rates are not carefully controlled and monitored, animals may suffer substantial stress from suffocation prior to loss of consciousness and death (see Inhaled Agents section of Guidelines).

Conducting this procedure on small pigs requires a container large enough for the size and number of pigs to be euthanized. Pigs may be exposed to CO<sub>2</sub> by gradually displacing ambient gases (introducing CO<sub>2</sub> into the container) or by introducing the animals into a prefilled environment. In the gradual-fill approach, pigs are placed in an enclosed container and CO<sub>2</sub> flow is initiated at a rate and for a time to reach a level sufficient to achieve euthanasia. In the prefill approach, a concentrated environment of CO<sub>2</sub> is created, pigs are placed in that environment, and CO<sub>2</sub> flow is resumed to maintain effective euthanasia concentrations. In both methods, exposure of pigs with normal respiration to a constant supply of 80% to 90% CO<sub>2</sub> for a minimum of 5 minutes is necessary for effective euthanasia.<sup>203-212</sup>

Carbon dioxide offers advantages for euthanasia, including that it is relatively inexpensive, nonflammable and nonexplosive, and clean (no blood loss). Drawbacks to the use of CO<sub>2</sub> are that it requires spe-



cial equipment and training for efficient and safe application. Systems must be able to achieve a level of anesthesia while not causing hypothermia. An appropriate pressure-reducing regulator, with or without a flow meter, capable of generating the recommended displacement rates for the size container being utilized is necessary. As with other methods, death must be verified for each animal following administration of CO<sub>2</sub>.<sup>182</sup>

For young pigs, movement during the induction phase has caused some to question the degree of stress that may be induced with this method. Some interpret these movements as indications of aversion. There is evidence that such reactions may be normal for pigs in an unconscious state.<sup>204,209,210</sup> Small or incapacitated piglets have low tidal volumes and will not achieve death as rapidly as larger, more viable pigs. Carbon dioxide euthanasia in chamber settings has not been extensively studied for larger pigs. Meyer and Morrow<sup>213</sup> recommend that chamber volume be exchanged at least 2.5 times to accommodate the wash-in-wash-out principle regardless of the size of swine to be euthanized. Monitoring of equipment and gas must be routine and consistent to ensure there is always sufficient gas to accomplish the objective of euthanasia. Carbon dioxide containers should never be placed in an unventilated area due to risks associated with an overdose of gaseous CO<sub>2</sub> for humans.

#### S3.3.2.2.2 Physical methods

**NPCB**—A purpose-built NPCB may be used for euthanasia of young pigs. The concussive impact of the bolt induces an immediate loss of consciousness that when followed by an adjunctive method to ensure death meets the criteria for euthanasia. The NPCB works best in younger pigs before the frontal bones are fully developed and hardened.

Use of a proper functioning NPCB with appropriate charges offers the advantage of delivering a uniform concussive force to the skull (controlled blunt force trauma). This reduces the potential for ineffective stunning and euthanasia that may occur more often with the use of manually applied blunt force trauma. However, this method requires immediate application of an adjunctive method to ensure euthanasia.<sup>214</sup>

**PCB**—Use of well-maintained PCB guns with ammunition appropriately selected for the size of the animal is acceptable with conditions as a method of euthanasia for growing and adult swine.<sup>184,185</sup> Proper application of the PCB requires restraint of the animal because the device must be held firmly against the forehead over the site described for gunshot (Figure 12). When performed correctly, the pig drops to the floor immediately, exhibiting varying amounts of tonic and clonic muscle movements. Confirmation that the animal has been rendered insensible includes observing that rhythmic breathing stops, righting reflex is absent, vocalization is absent, and no palpebral reflexes or responses to noxious stimuli are present. All pigs should be observed for evidence

of these responses until death has been confirmed. For more information, see the section on grow-finish swine earlier in the Guidelines.

**Electrocution**—Electrocution is acceptable with conditions for swine over 3 days of age.<sup>214</sup> Details are provided earlier in this section and in the Physical Methods section of the Guidelines.

### S3.3.3 SUCKLING PIGS

Options for the euthanasia of suckling pigs include CO<sub>2</sub>; mixtures of CO<sub>2</sub> with Ar, N<sub>2</sub>, or N<sub>2</sub>O; CO; inhaled anesthetics; purpose-built NPCB; electrocution (for pigs over 3 days of age); anesthetic overdose; and blunt force trauma. Described in detail are the application of NPCB, manually applied blunt force trauma, and CO<sub>2</sub>. See previous sections of the Guidelines for more detailed information on the application of other euthanasia techniques.

#### S3.3.3.1 Acceptable methods

##### S3.3.3.1.1 Injectable agents

**Barbiturates and barbituric acid derivatives**—Suckling pigs may be euthanized by IV administration of euthanasia solutions containing barbiturates. Because these drugs are controlled substances they must be administered by personnel who are registered with the US DEA. Strict record keeping is required of all who use and store these drugs.

Many find euthanasia by the IV administration of an anesthetic less aesthetically displeasing than administration of CO<sub>2</sub>, captive bolt, manually applied blunt force trauma, or electrocution. Disposal of animals euthanized with barbiturates is complicated by concerns about residues that create risks for scavengers and other domesticated animals that may consume portions of the animal's remains.

#### S3.3.3.2 Acceptable with conditions methods

##### S3.3.3.2.1 Inhaled agents

**Carbon dioxide**—Carbon dioxide may be effective as a method of euthanasia for small groups of neonatal piglets<sup>214</sup>; however, the parameters of the technique need to be optimized and published to ensure consistency and repeatability.

##### S3.3.3.2.2 Physical methods

**NPCB**—The NPCB can be an effective method of euthanasia for young piglets.<sup>215,216</sup> Loss of consciousness and death are caused by a severe nonpenetrating concussive force applied to the forehead of the piglet. The utility of the NPCB is focused on the unique condition in suckling and young pigs where the frontal bones are not fully developed, leaving the brain susceptible to blunt, high-velocity impact.

When used in appropriately sized and aged pigs a secondary step to ensure death is unnecessary.<sup>217,218</sup> The NPCB can be powered pneumatically or through the use of appropriate ammunition. Some brands of captive bolt guns have been made versatile by providing different heads (varying length of bolt and penetrating or nonpenetrating end), and ammunition for various-size pigs, which allows the same gun to be used in different situations. Current research indi-

cates that euthanasia using an NPCB is effective and repeatable with sufficient power, ammunition, and consistency in the gun design.<sup>215,216</sup>

*Manually applied blunt force trauma*—Manually applied blunt force trauma, when performed correctly, meets the definition of euthanasia, namely causing minimal distress with rapid loss of consciousness leading to death. As with the NPCB, the utility of manually applied blunt force trauma is focused on the unique condition in suckling and young pigs where the frontal bones are not fully developed, leaving the brain susceptible to blunt, high-velocity impact. This method may be less aesthetically acceptable than other alternatives, but when performed with proper training and proper application of technique, death is rapid. Uncertainty of success often causes repeated application or selection of an alternative euthanasia method.<sup>216</sup> The AVMA encourages those using manually applied blunt force trauma to the head as a euthanasia method to actively search for alternatives to ensure that criteria for euthanasia can be consistently met.

### S3.4 POULTRY

Euthanasia methods for poultry (domesticated birds used for egg, meat, or feather production [eg, chickens, turkeys, quail, pheasants, ducks, geese]) include gas inhalation, manually applied blunt force trauma, cervical dislocation, decapitation, electrocution, gunshot, captive bolt, and injectable agents. Where appropriate, additional comments are included to address physiologic differences among avian species, variations in environment, and the size or age of birds.

#### S3.4.1 ACCEPTABLE METHODS

##### S3.4.1.1 Noninhaled agents

*Overdoses of injectable anesthetics, including barbiturates and barbituric acid derivatives*—Poultry may be euthanized by IV injection of overdoses of anesthetics, including barbiturate and barbituric acid derivatives. Because these drugs are controlled substances they must be administered by personnel who are registered with the US DEA. Strict record keeping is required of all who use and store these drugs.

Many find administration of an anesthetic less displeasing than administration of CO<sub>2</sub>, CO, captive bolt, manually applied blunt force trauma, or electrocution. Therefore, it may be preferred in some settings. A disadvantage of this method is that tissues from animals euthanized with barbiturates may not be used for food and may not be suitable for diagnostic evaluation. Furthermore, options for disposal of animals euthanized with barbiturates are complicated by concerns for residues that create risks for scavengers and other domesticated animals that may consume portions of the animal's remains.

#### S3.4.2 ACCEPTABLE WITH CONDITIONS METHODS

##### S3.4.2.1 Inhaled gases

Inhaled gases may be used satisfactorily for euthanasia of poultry, and detailed information about the various types of inhaled gases is available in the Inhaled Agents section of the Guidelines. When inhaled gases are used for euthanasia, birds should be checked to verify death because they may appear dead but, depending on the agent, can regain consciousness if the exposure time or the concentration of the agent is insufficient. Gases must be supplied in purified forms without contaminants or adulterants, typically from a commercially supplied cylinder or tank. The gas-dispensing system should have sufficient capacity and control to maintain the necessary gas concentrations in the container being utilized, and the container itself should be sufficiently airtight to hold the gas at appropriate levels.

*Carbon dioxide*—The most common gas used for euthanasia of poultry is CO<sub>2</sub>, and its application has been extensively studied for chickens, turkeys, and ducks with information available about behavioral responses, times to collapse, unconsciousness, death, loss of somatosensory evoked potentials, loss of visually evoked responses, and changes in EEG and ECG (see Inhaled Agents section of the Guidelines). There is no flow rate requirement at this time for the use of carbon dioxide in poultry. Carbon dioxide has successfully been applied for euthanasia of non-hatched eggs (pips), newly hatched poultry in hatcheries, and adult birds (including routine euthanasia of large commercial laying hen flocks<sup>219–221</sup> and on farms keeping birds for research or elite genetics). Because neonatal birds may be more accustomed to high concentrations of CO<sub>2</sub> (incubation environments typically include more CO<sub>2</sub>), concentrations necessary to achieve rapid euthanasia of pipped eggs or newly hatched chicks may be substantially greater (as high as 80% to 90%) than for adults of the same species. One study<sup>222</sup> found that CO<sub>2</sub> concentrations needed to be held at 75% or higher for 5 minutes to ensure euthanasia of day-of-hatch chicks.

Carbon dioxide may invoke involuntary (unconscious) motor activity in birds, such as flapping of the wings or other terminal movements, which can damage tissues and be disconcerting for observers.<sup>223,224</sup> Slower induction of euthanasia in hypercapnic atmospheres reduces the severity of convulsions after loss of consciousness.<sup>225,226</sup> Death normally occurs within minutes, depending on the species and the concentration of CO<sub>2</sub> present in the closed chamber.

*Carbon monoxide*—Carbon monoxide may also be used for euthanasia of poultry. More convulsions may be observed in the presence of CO than normally occur when CO<sub>2</sub> is used for euthanasia.<sup>227</sup> The CO flow rate should be sufficient to rapidly achieve a uniform concentration of at least 6% after birds are placed in the chamber (see Inhaled Agents section). Only pure, commercially available CO should be

used. The direct application of products of combustion or sublimation is not acceptable due to unreliable or undesirable composition and or displacement rate. Appropriate precautions must be taken to ensure human safety because CO has a cumulative effect in binding hemoglobin. Due to danger to human safety, carbon monoxide is not recommended for use in most commercial operations.

*Nitrogen or argon*—Nitrogen or Ar, used alone or mixed with approximately 30% CO<sub>2</sub>, is acceptable with conditions for euthanasia of poultry provided the residual atmospheric O<sub>2</sub> level can be reduced to and held at sufficiently low levels (eg, 2% to 3%).<sup>228-230</sup> These agents tend to cause more convulsions (eg, wing flapping) than CO<sub>2</sub> in air (see Inhaled Agents section of the Guidelines).<sup>225,231</sup> It has also been noted that convulsions may start when consciousness, at least to some degree, may still be a possibility.<sup>232,233</sup>

*Reduction of atmospheric pressure*—Reduction of atmospheric pressure by drawing a vacuum in a chamber has been demonstrated to euthanize chicks and mature poultry in a manner comparable to that associated with anoxia-based methods involving inert gases such as N<sub>2</sub> or Ar.<sup>222,234</sup> The intensity of convulsions after loss of posture (ie, after loss of consciousness) is similar to that seen with anoxia-based methods. This method is commonly known as LAPS (low-atmospheric-pressure stunning).

#### S3.4.2.2 Physical methods

The following methods are acceptable with conditions for euthanasia of poultry. Euthanasia methods should be chosen based on the welfare of the bird, human safety, skill and training of personnel, availability of equipment, and the ability to adequately restrain the bird.

*Cervical dislocation*—When performed on conscious poultry, cervical dislocation must result in luxation of the cervical vertebrae without primary crushing of the vertebrae and spinal cord. Manual or mechanical cervical dislocation may be used for poultry of an appropriate size and species when performed by competent personnel who correctly apply the technique. In some classes of poultry there is evidence that cervical dislocation may not cause immediate unconsciousness.<sup>235-238</sup> Cervical dislocation techniques that cause luxation of the vertebrae at or close to the skull may improve kill success and achieve more rapid reduction of reflexes.<sup>239</sup> When performed manually, the shanks of the bird should be grasped (or wings if grasped at the base) and the neck stretched by pulling on the head while applying a ventrodorsal rotational force to the skull until an obvious, typically sudden, reduction of resistance indicates separation of the cervical vertebrae. Separation of the vertebrae should be verified by palpation. Crushing of the cervical vertebrae and spinal cord is not acceptable unless the bird is first rendered unconscious.

*Decapitation*—Decapitation is acceptable with conditions for the euthanasia of poultry when per-

formed by competent personnel. Decapitation should be executed with a sharp instrument, ensuring rapid and unobstructed severing of the head from the neck.

*Manually applied blunt force trauma*—Euthanasia by manually applied blunt force trauma to the head is acceptable with conditions for poultry, particularly birds such as turkeys or broiler breeder chickens that are too large for cervical dislocation.<sup>240,241</sup> Manually applied blunt force trauma must be correctly applied by competent personnel. Blunt force trauma consisting of a single sufficiently strong hit placed in the frontoparietal region of the head resulted in loss of auditory evoked potentials in broilers, broiler breeders, and turkeys of up to 16 kg (35.2 lb).<sup>241</sup> Fatigue can lead to inconsistency in application, creating concern that the technique may be difficult to apply humanely to large numbers of birds. For this reason, the AVMA encourages those using manually applied blunt force trauma to the head as a euthanasia method to search for alternatives.

*Electrocution*—Electrocution is acceptable with conditions for euthanasia of individual birds. Birds subjected to electrocution should be observed to ensure death or an adjunctive method, such as exsanguination or cervical dislocation, should be performed immediately afterwards to ensure death. A small percentage of birds do not develop ventricular fibrillation even when exposed to high amperage current.

*Gunshot*—Gunshot is acceptable with conditions for free-ranging poultry and ratites when capture or restraint would potentially be highly stressful for the animal or dangerous for humans. Gunshot is not recommended for captive poultry where restraint is feasible.

*PCB and NPCB*—Captive bolts (penetrating or nonpenetrating) are acceptable with conditions for euthanasia of poultry (eg, turkeys, broiler breeders, ratites, waterfowl) when performed by competent personnel (**Figures 20–22**). The captive bolt device must be appropriately designed and configured for the species and bird size, provide sufficient impact energy, and be properly applied. The bird should be appropriately restrained to avoid injury to personnel.<sup>135,239,241-243</sup> Birds should be observed following captive bolt administration to ensure that death occurs. Any bird showing signs of recovery must receive a second shot or be killed by some other means that is acceptable for a conscious bird.

### S3.4.3 ADJUNCTIVE METHODS

*Potassium chloride or magnesium sulfate*—Although IV or intracardiac administration of potassium chloride or magnesium sulfate to a conscious bird as a sole method of euthanasia is unacceptable, it is acceptable to administer these agents to a bird that is fully anesthetized or otherwise unconscious as a means to ensure death.

*Exsanguination*—Although exsanguination of a conscious bird is an unacceptable method of euthana-

sia, it is acceptable to exsanguinate birds that are fully anesthetized or otherwise unconscious as a means to ensure death. Biosecurity precautions during and following exsanguination should be observed as part of appropriate disease response.

### S3.4.4 EMBRYOS AND NEONATES

In addition to methods involving inhaled agents mentioned previously, the following methods are acceptable with conditions for euthanasia of embryos or neonates.

Embryonated eggs may be destroyed by prolonged exposure (20 minutes) to CO<sub>2</sub> or before 80% of incubation, cooling (4 hours at 40°F), or freezing.<sup>95</sup> In some cases inhaled anesthetics can be administered through the air cell at the large end of the egg. Egg addling can also be used.<sup>244</sup> Embryos that have been exposed can be decapitated.

Maceration, via use of a specially designed mechanical apparatus having rotating blades or projections, causes immediate fragmentation and death of newly hatched poultry and embryonated eggs.<sup>221</sup> A review by the American Association of Avian Pathologists<sup>245</sup> of the use of commercially available macerators for euthanasia of chicks, poults, and pipped eggs indicates that death by maceration in poultry up to 72 hours old occurs immediately with minimal pain and distress. Maceration is an alternative to the use of CO<sub>2</sub> for euthanasia of poultry up to 72 hours old. Maceration is believed to be equivalent to cervical dislocation and cranial compression as to time element, and is considered to be an acceptable means of euthanasia for newly hatched poultry by the Federation of Animal Science Societies,<sup>246</sup> Agriculture Canada,<sup>247</sup> World Organization for Animal Health,<sup>136</sup> and European Council.<sup>248</sup>

Maceration requires special equipment that must be kept in excellent working order. Newly hatched poultry must be delivered to the macerator in a way and at a rate that prevents a backlog at the point of entry into the macerator and without causing injury, suffocation, or avoidable distress before maceration.

## S4 Equids

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method are met.

### S4.1 GENERAL CONSIDERATIONS

#### S4.1.1 HUMAN SAFETY

When equids are euthanized, consideration should be given to the unpredictability of a falling or thrashing equid. Most methods of euthanasia will result in some degree of exaggerated muscular activity after the equid falls even if the equid is not experiencing pain or distress. Whatever euthanasia method is used should not put personnel at unnecessary risk.

### S4.1.2 DISPOSAL OF REMAINS

For equids euthanized with pentobarbital, disposal of remains must be carried out promptly through on-farm burial, incineration or cremation, direct haul to a solid waste landfill, or biodigestion. This will help prevent exposure of wildlife and domestic animals to potentially toxic barbiturate residues. Disposal of remains must be conducted in accord with all federal, state, and local regulations.

## S4.2 METHODS

### S4.2.1 ACCEPTABLE METHODS

#### S4.2.1.1 Noninhaled agents

##### *Barbiturates or barbituric acid derivatives*—

Pentobarbital or a pentobarbital combination is the principal choice for equine euthanasia by chemical means. Because a large volume of solution must be injected, use of an IV catheter placed in the jugular vein will facilitate the procedure. To facilitate catheterization of an excitable or fractious equid, a tranquilizer, such as acepromazine, or an  $\alpha_2$ -adrenergic receptor agonist can be administered, but these drugs may prolong time to loss of consciousness because of their effect on circulation and may result in varying degrees of muscular activity and agonal gasping. Opioid agonists or agonist-antagonists in conjunction with  $\alpha_2$ -adrenergic receptor agonists may further facilitate restraint.

### S4.2.2 ACCEPTABLE WITH CONDITIONS METHODS

#### S4.2.2.1 Physical methods

##### *PCB and gunshot*—

Penetrating captive bolt and gunshot are considered acceptable with conditions for euthanasia of equids. Both should only be used by well-trained personnel who are regularly monitored to ensure proficiency, and firearms must be well maintained. Appropriate restraint is required for application of the PCB and special care should be taken to ensure that personnel are not injured by ricochet from free bullets.

The correct anatomic site for application of gunshot and PCB is illustrated in **Figure 23**.<sup>249</sup> The site for entry of the projectile is described as being on the intersection of 2 diagonal lines each running from the outer corner of the eye to the base of the opposite ear.

### S4.2.3 ADJUNCTIVE METHODS

Recently, rendering plants and landfills have refused equine carcasses euthanized with pentobarbital. For this reason, adjunctive methods should be considered. Anesthetizing the equid with xylazine-ketamine should be followed by one of the following: (1) saturated solution of potassium chloride injected IV or intracardially; (2) saturated solution of magnesium sulfate injected IV; or (3) 60 mL of 2% lidocaine injected intrathecally.<sup>250</sup> Each of these performed in an equid in a deep surgical plane of anesthesia is an acceptable method to invoke cardiac arrest and death.

Intrathecal administration of 2% lidocaine hydrochloride to anesthetized horses resulted in sequential loss of respiration, loss of cerebrocortical activity, loss of brainstem function, and loss of cardiovascular activity, with loss of cerebrocortical activity occurring within 3.38 minutes after intrathecal lidocaine administration.<sup>214</sup> Heart sounds persisted for up to 10 minutes, and ECG activity lasted up to 21 minutes, long after all brain activity had ceased. Tissues from horses euthanized via intrathecal lidocaine administration contained drug residues considered well below concentrations expected to pose hazards to scavenging animals.<sup>213</sup>

#### **S4.2.4 UNACCEPTABLE METHODS**

*Chloral hydrate*—Chloral hydrate has an almost immediate sedative action, but unless it is combined with other anesthetics, onset of anesthesia is delayed. Associated adverse effects can be severe and aesthetically objectionable, and chloral hydrate also has limited availability. For these reasons, chloral hydrate is an unacceptable means of euthanizing equids.

#### **S4.3 SPECIAL CASES AND EXCEPTIONS**

In emergency situations, such as euthanasia of an equid with a serious injury at a racetrack or another equestrian event, it may be difficult to restrain a dangerous equid for IV injection. While administration of a sedative might be desirable, in some situations it is possible the equid could injure itself or bystanders before a sedative could take effect. In such cases, a neuromuscular blocking agent (eg, succinylcholine) may be administered to the equid IM or IV, but the equid must be euthanized via an appropriate method as soon as the equid can be controlled. Succinylcholine alone or without sufficient anesthetic is not acceptable for euthanasia.

### **S5 Avians**

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method are met.

#### **S5.1 GENERAL CONSIDERATIONS**

The following comments and recommendations pertain to pet, aviary, falconry, racing, research, and zoo birds. Information about appropriate euthanasia methods for wild birds can be found in the Reptiles, Zoo Animals, and Wildlife section of the Guidelines, whereas euthanasia of poultry and other birds used for food is addressed in the Animals Farmed for Food and Fiber section.

Few peer-reviewed reports are available in the scientific literature about euthanasia of individual or small groups of birds. The information that does exist comprises anecdotal accounts in book chapters, guidelines from various associations, and journal roundtable discussions and editorials.<sup>224,251–256,c</sup> There are scientific studies<sup>233,235,238,257–259</sup> comparing various

methods for depopulation of commercial poultry, but these methods may or may not meet the criteria for euthanasia, and may or may not be applicable to individual birds or small groups of birds.

Because this taxon comprises more than 8,000 species, the choice of euthanasia method for a particular bird will depend greatly on its species, size, anatomic and physiologic characteristics, environment, degree of domestication, clinical state, and anticipated and actual response to restraint. Personnel performing euthanasia should be familiar with the species being euthanized, be able to interpret avian behavior indicative of stress, and use their knowledge and experience to choose restraint and euthanasia options that alleviate or minimize distress and result in rapid death. Legal requirements may apply in cases involving endangered or migratory species.

#### **S5.1.1 ANATOMY AND PHYSIOLOGY**

Birds differ anatomically and physiologically from mammals and these differences will affect whether and how particular euthanasia methods may be acceptably applied. Because birds lack a diaphragm, they have a single coelomic cavity, rather than separate thoracic and abdominal cavities. When giving intracoelomic injections care must be taken that material is not injected into the air sacs, which could potentially drown the bird or expose its respiratory system to irritating substances. Air sacs act as bellows to ventilate birds' small, nonexpanding lungs.<sup>260</sup> Because there is no diaphragm, birds need to be able to move their sternum ventrally and cranially to breathe.<sup>261</sup> Birds also have hollow, pneumatic bones, such as the humerus and femur, which communicate directly with the respiratory system. Pre-euthanasia and euthanasia drugs should not be administered via the intraosseous route into the humerus or femur because drowning or irritation to the respiratory system may occur. Intraosseous catheters can, however, be safely placed in birds, preferably in the distal ulna or proximal tibiotarsus.

A bird's respiratory system has greater capacity to process air than a mammal's due to a unique unidirectional flow of air through the lungs (which prevents mixing of inspired and expired air), more efficient gas exchange, and a greater surface area over which O<sub>2</sub> can be exchanged (more and smaller air capillaries [3 μm] than the smallest mammalian alveoli [35 μm]).<sup>261</sup> Because of their greater capacity to process air, birds are more sensitive than mammals to inspired toxicants (eg, the proverbial canary in the coal mine collapsing before humans detect the methane in the air).<sup>262</sup>

#### **S5.1.2 RESTRAINT**

Manual restraint for administering pre-euthanasia or euthanasia drugs is possible for many bird species. Nets or other equipment may be required or may improve conditions for both birds and people when handling birds less acclimated to human con-

tact (eg, birds in zoos, wild birds). Multiple personnel may be required to safely handle larger species, such as ratites, and at least 1 additional person should be available to assist in case of an emergency. Chemical restraint may be useful in some situations, particularly for dangerous birds where human safety may be compromised by efforts at manual restraint. Drugs used for chemical restraint that are administered at high doses may serve as the first step of a 2-step euthanasia process.

## S5.2 METHODS

Individual birds in a clinical or research setting can best be rendered unconscious by use of an inhaled agent (eg, isoflurane, sevoflurane, or halothane), prior to IV administration of an acceptable injectable euthanasia agent (eg, sodium pentobarbital). The following methods are considered to be acceptable or acceptable with conditions for avian species. For more detailed, non-species-specific information on various agents and methods, please refer to the Inhaled Agents, Noninhaled Pharmaceutical Agents, and Physical Methods sections of the Guidelines.

### S5.2.1 ACCEPTABLE METHODS

#### S5.2.1.1 Noninhaled agents

Intravenous injection of an injectable euthanasia agent is the quickest and most reliable means of euthanizing birds when it can be performed without causing fear or distress. Wild, fearful, or excited birds may require a sedative or anesthesia before IV injection can be performed. When IV injection is impossible, injectable euthanasia agents can be administered via intracoelomic, intracardiac, or intraosseous routes only if a bird is unconscious or anesthetized. If the intracoelomic route is used for birds, injection into the air sacs must be avoided, because of the potential for respiratory compromise, irritation of the respiratory system, and delayed absorption via the air sacs. Euthanasia agents should also not be administered via the intraosseous route into the humerus or femur because of the potential for drowning or irritation to the respiratory system. Regardless of the route of administration, injectable agents can precipitate in tissues and can induce artifacts at necropsy and on histopathologic examination.<sup>224,254,263</sup> Barbiturates and barbituric acid derivatives can be administered IV for euthanasia of anesthetized or properly restrained unanesthetized birds. Barbiturates commonly used for injection are available as sodium salts that are alkaline and may be irritating and painful when injected directly into tissues, rather than IV. Therefore, when IV injection is impossible, injectable euthanasia agents can be administered via intracoelomic, intracardiac, or intraosseous routes only if a bird is unconscious, or anesthetized. Concepts regarding barbiturate use in mammals generally also apply to birds and more information is available in the Noninhaled Agents section of the Guidelines.

### S5.2.2 ACCEPTABLE WITH CONDITIONS METHODS

#### S5.2.2.1 Inhaled agents

*Inhaled anesthetics*—Inhaled anesthetics may be used at high concentrations as a sole method of euthanasia or may be used to render birds unconscious prior to application of other methods of euthanasia.<sup>244,252</sup> Exposure to high concentrations of inhaled anesthetics (eg, halothane, isoflurane, sevoflurane, with or without N<sub>2</sub>O) is acceptable with conditions for euthanasia for birds. Birds exposed to high concentrations of inhaled anesthetic gases lose consciousness rapidly. Euthanasia via inhaled gases may be more practical than use of an injectable agent if large numbers of birds, such as in flock or aviary situations, must be euthanized. Euthanasia by exposure to gas anesthetics also induces minimal tissue damage and results in the least amount of tissue artifact for necropsy.<sup>224,254</sup>

*Carbon dioxide*—High (> 40%) concentrations of CO<sub>2</sub> induce anesthesia initially followed by loss of consciousness. Euthanasia via exposure to CO<sub>2</sub> has been described for individual birds and small groups,<sup>252</sup> and its application to euthanasia of chickens, turkeys, and ducks has been studied extensively, resulting in information regarding times to collapse, unconsciousness, and death; loss of somatosensory evoked potentials; loss of visually evoked responses; and changes in EEG and ECG.<sup>257-259,264</sup> Application rate of CO<sub>2</sub> needs to be balanced with situational needs as rapid increases in CO<sub>2</sub> concentration decrease the amount of time to loss of posture and consciousness, while slower increases in concentration may cause less aversion or reaction, but increase time of exposure. Field applications of CO<sub>2</sub> for broilers have resulted in stress levels similar to that invoked via routine handling<sup>265</sup> or stress and distress similar to the handling or restraint required for other methods of euthanasia.<sup>259</sup> In a recent study, most turkeys would voluntarily enter a feeding chamber filled with Ar (90%), or a mixture of Ar (60%) and CO<sub>2</sub> (30%), compared with only 50% of turkeys that would voluntarily enter the chamber when filled with a high concentration of CO<sub>2</sub> (72%) alone, suggesting an aversion to 72% CO<sub>2</sub>.<sup>266</sup> More research is needed to better understand this comparative aversion in turkeys (eg, whether it is dose or species dependent and availability of agent).

Concepts regarding the use of CO<sub>2</sub> in mammals as described in the Inhaled Agents section of the Guidelines generally also apply to birds. Exposure to CO<sub>2</sub> may cause involuntary (unconscious) motor activity, such as flapping of the wings, which can damage tissues and be disconcerting to, and potentially dangerous for, observers.<sup>223,224</sup>

There are some special considerations for the use of CO<sub>2</sub> for euthanasia of birds. Neonatal birds may be more acclimated to high CO<sub>2</sub> concentrations, because the unhatched bird's environment typically has a high CO<sub>2</sub> concentration (as high as 14% in the embryonic

chicken). Consequently, CO<sub>2</sub> concentrations required to achieve euthanasia of newly hatched chicks may be much higher (as much as 80% to 90%) than those for adults of the same species.<sup>244,259</sup> Diving birds also have physiologic adaptations to hypercapnia and may require higher CO<sub>2</sub> concentrations for euthanasia.

**Carbon monoxide**—Concepts regarding the use of CO for euthanasia of mammals also apply to birds. See the Inhaled Agents section of the Guidelines for details.

**Nitrogen and argon**—Inert gases such as N<sub>2</sub> and Ar, and gas mixtures involving these gases (including mixtures with CO<sub>2</sub>), have been used for euthanasia of poultry,<sup>267</sup> but are not recommended for euthanasia of companion birds.

Behavioral responses of broiler chickens were examined during short (10 seconds) exposures to 100% Ar, 100% N<sub>2</sub>, or mixtures (80% Ar:20% N<sub>2</sub> and 80% N<sub>2</sub>:20% Ar). Normal feeding and no aversive behaviors were observed.<sup>268</sup> Birds appear to not have intrapulmonary chemoreceptors for N<sub>2</sub> and Ar, and this may account for a lack of aversion during their initial exposure to and hypoxia from these gases.<sup>267</sup> As a euthanasia agent, Ar gas mixed with < 2% O<sub>2</sub> was shown to induce rapid loss of posture (average, 11 seconds), convulsions (average, 22 seconds), unconsciousness, and death (isoelectric EEG in 1 minute).<sup>269</sup> Convulsions can occur during euthanasia with these inert gases, but because these signs occurred after collapse and loss of consciousness, these gases are considered to be humane for the birds involved.<sup>267</sup>

#### S5.2.2.2 Physical methods

Physical methods of euthanasia may be necessary in some field situations if other methods of euthanasia are impractical or impossible to implement. That said, there is little scientific information available regarding the effect of various physical methods on electrical activity in the brain of birds, which makes evaluation of the humaneness of these procedures difficult.

**Cervical dislocation**—Cervical dislocation has generally been used for small birds (< 200 g) when no other method is available, but the procedure has been performed on birds as large as 2.3 kg (5.1 lb). It should only be performed by well-trained personnel who are regularly monitored to ensure proficiency. Skilled individuals have been able to humanely perform cervical dislocation in poultry. There is limited research specific to birds concerning electrical activity in the brain following cervical dislocation. Cervical dislocation of chickens (average weight of 2.3 kg) did not result in loss of visually evoked responses in 90% of cases when compared with use of a percussion bolt pistol, suggesting that fewer than 10% of cervical dislocations resulted in concussion.<sup>238</sup> In 3-week-old turkeys (average weight of 1.6 kg [3.5 lb]) time to insensibility (based on nictitating membrane movement) was longer, but time to death (based on cessation of movement) was shorter after cervical dislocation compared with use of an NPCB and blunt

force trauma.<sup>235</sup> Whether pain is perceived is not known. Consciousness and perception of pain are not necessarily concurrent.

**Decapitation**—Based on information currently available, decapitation is considered to be acceptable with conditions for euthanasia of small (< 200 g) birds. The AAZV Guidelines for Euthanasia of Nondomestic Animals<sup>244</sup> also lists decapitation as acceptable with conditions, and suggests the method may be preferred over cervical dislocation under certain field conditions due to clear evidence of a successful procedure. One study<sup>270</sup> indicated that several methods of partial, mechanical decapitation of chickens (weighing 2.1 to 3.5 kg [4.6 to 7.7 lb]) did not result in the loss of visually evoked responses in 90% of cases when compared with use of a percussion bolt pistol and concluded that fewer than 10% of cervical dislocations resulted in concussion. In another study decapitation applied to anesthetized chickens resulted in visually evoked responses up to 30 seconds following decapitation, but because the responses were obtained from anesthetized chickens it is not possible to conclude any association with cognitive processes.<sup>95,270,271</sup> As indicated previously (see discussion of Consciousness and Unconsciousness in the Guidelines), at some level between behavioral unresponsiveness and the induction of a flat EEG, consciousness must vanish; however, EEG data cannot provide definitive answers as to onset of unconsciousness.

**Gunshot**—Gunshot is not recommended as a method for captive birds, where restraint is feasible. Its use for wild birds is addressed in the Zoologic and Free-Ranging Nondomestic Animals section of the Guidelines.

### S5.2.3 ADJUNCTIVE METHODS

**Potassium chloride**—Although administration of potassium chloride to a conscious, unanesthetized bird is considered to be an unacceptable method of euthanasia, potassium chloride may be administered via the IV or intracardiac routes if a bird is unconscious or completely anesthetized prior to the injection.

**Exsanguination**—Although exsanguination of a conscious, unanesthetized bird is an unacceptable approach to euthanasia, exsanguination may be used for euthanasia of unconscious or anesthetized birds. This approach may be appropriate if blood samples are needed for diagnostic or research purposes.

**Thoracic compression**—Although thoracic compression of a conscious, unanesthetized bird is an unacceptable approach to euthanasia, it may be used as an adjunctive method for animals that are insentient.

### S5.2.4 UNACCEPTABLE METHODS

Thoracic compression (also known as cardiopulmonary or cardiac compression) is a method that has been used by biologists to terminate the lives of wild small mammals and birds, mainly under field conditions.<sup>272</sup> Although this method has been used exten-

sively in the field, data supporting its use, such as degree of distress induced and time to unconsciousness or death, are limited.<sup>273</sup> Given current knowledge of the physiology of small mammals and birds, it cannot be assumed that thoracic compression does not result in pain or distress before animals become unconscious. Consequently, thoracic compression is an unacceptable method of euthanizing animals that are not deeply anesthetized or insentient due to other reasons, but is appropriate as a secondary method for animals that are insentient.

### **S5.3 EGGS, EMBRYOS, AND NEONATES**

Bird embryos that have attained > 80% incubation demonstrate EEG activity that is sustained, with increases in amplitude suggesting the potential for pain perception in conscious embryos; therefore they should be euthanized by similar methods used in avian neonates such as anesthetic overdose, decapitation, or prolonged (> 20 minutes) exposure to CO<sub>2</sub>. Eggs at < 80% incubation may be destroyed by prolonged exposure (> 20 minutes) to CO<sub>2</sub>,<sup>274</sup> cooling (< 4°C for 4 hours), or freezing. Because research is still evolving and there are species-specific differences in development, euthanasia of embryos should be performed based on the best available data and with attention to assuring, as best as possible, that conscious suffering does not occur.

## **S6 Fish and Aquatic Invertebrates**

### **S6.1 GENERAL CONSIDERATIONS**

Fish and aquatic invertebrates play important roles as food, pets, research subjects, display animals, sources of recreation, and key components of healthy ecosystems. In each of these situations it may be necessary to cause the death of some animals. Considerable evidence is accumulating that suggests it is appropriate to consider the possibility of pain perception in these species.<sup>275-287</sup> The aim is to accomplish death for these animals rapidly with the minimum amount of pain and distress practicable. Because the environment associated with fish and aquatic invertebrates in each of their roles is different, and because knowledge about the evolutionary and societal status of poikilothermic animals (lower vertebrates and invertebrates) is limited, identifying and applying appropriate criteria for euthanasia can be difficult.

#### **S6.1.1 TERMS APPLICABLE TO ENDING LIFE**

Specific to fish, the 3 main terms used to describe the ending of life are euthanasia, slaughter, and humane killing. There is often confusion regarding how these terms and their associated methods differ. The methods described in the Guidelines serve as guidance for veterinarians and others who may need to perform euthanasia. These Guidelines are not intended to address slaughter, depopulation, or other killing methods. The AVMA Guidelines for

the Humane Slaughter of Animals<sup>156</sup> and the AVMA Guidelines for the Depopulation of Animals<sup>288</sup> should be referenced in cases of slaughter or depopulation. The term *harvest* specifically refers to the act or process of gathering a crop, as in aquaculture and commercial fishing; however, *harvest* may also be used to describe fish removed from a water body by anglers. Whether harvested fish are slaughtered or humanely killed depends on the context of the activity.<sup>289-292</sup> Addressing euthanasia of invertebrates in some settings is not meant to discount the necessity for and suitability of slaughter and pest control techniques that do not meet the definition of euthanasia.

#### **S6.1.2 HUMAN AND ANIMAL CONSIDERATIONS**

Because of the diversity of physiologic and anatomic characteristics seen among species of fish and aquatic invertebrates, optimal methods for euthanasia will vary. Euthanasia choices for fish and aquatic invertebrates must account for animal stress responses and human safety concerns associated with handling, as well as differences in metabolism, respiration, and tolerance to cerebral hypoxia. Virtually all methods require that personnel be carefully trained and monitored (although some carry more risks of human ineffectiveness than others), some require DEA registration and record keeping, and chemicals regulated by the EPA can only be legally used according to their label directions. Immersion of the fish or aquatic invertebrate in an appropriate euthanasia solution is often an easier method than using injectable forms of euthanasia. Intracoelomic injections carry an inherent risk of organ damage and response time may vary. Intravenous injections require careful handling of fish, as well as trained and experienced personnel. Intramuscular injections with ketamine,  $\alpha_2$ -adrenergic receptor agonists, or Telazol<sup>d</sup> can be administered via pole syringe or dart gun to larger fish to facilitate handling and reduce handling stress for fish, but rarely achieve surgical planes of anesthesia in teleosts. In all cases, veterinarians and others with expertise relevant to the species of interest should be consulted; professional judgment and relevant expertise should be taken into account when ultimately determining the best method to use. In addition, it is often more difficult to ascertain when a fish or an aquatic invertebrate is dead as compared with birds and mammals. Some unique aspects of euthanasia for fish have been described.<sup>293,294</sup>

#### **S6.1.3 PREPARATION AND ENVIRONMENT**

As a general principle the preparations for euthanasia of fish should be very similar to the preparations for anesthesia of fish.<sup>295-297</sup> If possible, withholding food for 12 to 24 hours prior to euthanasia will reduce regurgitation, defecation, and nitrogenous waste production. The environment should be as quiet and nonstimulatory as possible given the circumstances. Light intensity should be reduced if



possible, but with adequate lighting for personnel. This can also be achieved through use of a dark or opaque container and lid, or by use of less intense lighting (eg, red light illumination, as red light does not penetrate water well).

Water quality should be similar to that of the environment from which the fish originated, or optimized for that species and situation, for the duration of euthanasia. If the water is of acceptable quality for fish health, the water in which they have been housed or captured should be used, and supplemental aeration and temperature control may be necessary. Either the immersion euthanasia solution is prepared with water from the fish housing system and the fish are transferred into it or a concentrated form of the anesthetic agent as a solution (containing buffering agent if appropriate) is introduced directly into the container of fish to minimize stressors. If euthanizing a large population of fish, it is important to monitor the anesthetic bath water quality (temperature, dissolved O<sub>2</sub>, ammonia, and organic loading, in particular). The euthanasia agent may need to be supplemented or replaced periodically because it will be removed when absorbed into the fish's bloodstream through the gills. Euthanasia methods should be tested in 1 animal or a small group of animals prior to use in a large population for an unfamiliar species, to ensure effectiveness.<sup>298</sup> If handling the fish is required, appropriate equipment (nets, gloves) should be used to minimize stressors.

#### **S6.1.4 INDICATORS OF DEATH IN FISH AND AQUATIC INVERTEBRATES**

Because the thousands of species of fish and aquatic invertebrates vary greatly in anatomic and physiologic characteristics, reliable indicators of death may not be available for some. However, there are some standard approaches that can be useful for many of the more commonly encountered species. Loss of movement, loss of reactivity to any stimulus, and initial flaccidity (prior to rigor mortis) may serve as indicators of death for fish and some aquatic invertebrates. More useful indicators for many fish include respiratory arrest (cessation of rhythmic opercular activity) for a minimum of 30 minutes and loss of eye-roll (vestibulo-ocular reflex, the movement of the eye when the fish is rocked from side to side). The latter is no longer present in fish that have been deeply anesthetized or euthanized.<sup>299</sup> The heart can continue to contract even after brain death or removal from the bodies of fish,<sup>300</sup> so the presence of a heartbeat is not a reliable indicator of life, but sustained absence of heartbeat is a strong indicator of death. For more sessile, less active organisms, or those with specific anatomic or physiologic adaptations that prevent use of these indicators, it may be more difficult to assess loss of consciousness and death, and consultation with species experts is recommended. Secondary methods of euthanasia are recommended, when appropriate, after the fish or aquatic invertebrate is anesthetized, to ensure euthanasia.

#### **S6.1.5 DISPOSITION OF EUTHANIZED ANIMALS**

Any euthanized fish or invertebrate should be promptly removed from its aquarium, pond, or other vessel and disposed of according to all pertinent federal, state, and local regulations, in a manner that will reduce the risk of disease spread, prevent pests and other nontarget species from gaining access to animal remains, and ensure human and environmental safety. Preventing environmental contamination by any life stage of fish that could hatch and/or survive outside an acceptable, enclosed body of water is an important consideration in confirmation of death and disposal of the animal's remains.

#### **S6.1.6 FISH AND AQUATIC INVERTEBRATES INTENDED FOR HUMAN CONSUMPTION**

As previously indicated, the term *slaughter* is used primarily to refer to the killing of animals intended for human consumption (eg, agricultural harvest, commercial fisheries) and these Guidelines are not intended to address that activity. However, when euthanasia of animals intended for human consumption is desired, tissue residues from the use of drugs and other chemicals will make many methods unacceptable unless they have been approved by the FDA for this purpose. Use of any unapproved chemicals for euthanasia prohibits entry of the fish into the food chain, either by rendering as fish meal or by distributing as directly consumed product.<sup>290</sup> With that said, currently there are no drugs approved by the FDA for euthanasia of fish or aquatic invertebrates. Carbon dioxide is a drug of low regulatory priority<sup>301</sup> that avoids unacceptable residues, but it is not an FDA-approved method for killing aquatic animals used for food. Physical methods that are acceptable with conditions include manually applied blunt force trauma to the head, decapitation, electrocution, and pithing. For more information regarding methods for slaughter, please refer to the AVMA Guidelines for the Humane Slaughter of Animals.<sup>156</sup>

#### **S6.2 FINFISH**

Common methods used to euthanize fish include noninhaled methods (ie, immersion and injection) and physical methods. Because of general differences in anatomy and application seen between finfish and terrestrial animals (especially with regard to primary respiratory organs, and aqueous vs air environment), techniques involving addition of drugs to the fish's environment (ie, the water), for purposes of this document, are considered noninhaled methods.

Descriptions of methods used to euthanize fish follow and include 1-step and 2-step procedures. Each method is further classified as acceptable, acceptable with conditions, or unacceptable considering characteristics of the methods and the environments in which euthanasia is conducted, including veterinary private practice (eg, companion and ornamental [display] fish), ornamental (aquarium) fish wholesale and

retail facilities, research laboratories, and fish kept outdoors and in fisheries. An acceptable method reliably meets the requirements of euthanasia. Methods that are acceptable with conditions reliably meet the requirements of euthanasia when specified conditions are met. An unacceptable method does not meet the requirements of euthanasia. Because fishes' anatomic and physiologic characteristics are quite different from those of mammals and birds, classification of techniques may vary from what has been recommended for other species.

### S6.2.1 NONINHALED AGENTS

*Immersion (1 step)*—Intentional overdose via immersion in anesthetic solutions is a common method of euthanasia for fish.<sup>298,302-304</sup> Some species exhibit aversive responses to particular anesthetic agents, while other species do not.<sup>305,306</sup> Through preference and approach-avoidance testing, many anesthetic agents currently used for euthanasia have been identified as being aversive to varying degrees. Despite some evidence of distress and aversion, immersive anesthetics continue to be administered to fish because the benefits associated with their use outweigh any distress and aversion they may cause, similar to use of inhaled agents for air-breathing animals. Fish should be left in the anesthetic solution for a minimum of 30 minutes after cessation of opercular movement.<sup>251,298,302</sup> A recent study<sup>307</sup> demonstrated that use of buffered MS 222 in a 1-step immersion technique was inadequate for euthanasia of goldfish (*Carassius auratus*), a hypoxia-tolerant species. Results from this study suggest that a 2-step method may be required for euthanasia of hypoxia-tolerant species: step 1, immersion to render the fish unconscious; step 2, a secondary adjunctive method to complete euthanasia (such as decapitation, pithing, or freezing). Options for immersion agents include the following:

- (1) Benzocaine or benzocaine hydrochloride, buffered. Solutions for immersion should be prepared in concentrations  $\geq 250$  mg/L and should be buffered.<sup>304</sup>
- (2) Carbon dioxide. Immersion in CO<sub>2</sub>-saturated water causes narcosis and loss of consciousness after several minutes.<sup>251,298</sup> Some species may exhibit hyperactivity prior to loss of consciousness.<sup>302</sup> Purity and concentration of CO<sub>2</sub> are important for effectiveness. Only CO<sub>2</sub> from a source that allows for careful regulation of concentration, such as from cylinders, is acceptable. Care must be taken when using CO<sub>2</sub> to prevent exposure to personnel (ie, euthanasia must be conducted in well-ventilated areas).
- (3) Ethanol. Ethanol has been suggested as an acceptable alternative method for fish euthanasia.<sup>308</sup> The depressive effects of ethanol on the CNS are well described,<sup>309</sup> and exposure of zebrafish via immersion has become a model for behavioral and molecular responses to alcohol, at concen-

trations from 10 to 30 mL of 95% ethanol/L.<sup>310-312</sup> At this dose, alcohol induces anesthesia, and prolonged immersion produces death via respiratory depression causing anoxia. This is not equivalent to immersing fish directly into preservative concentrations of ethanol (70%), which is not acceptable as a euthanasia method.

- (4) Eugenol, isoeugenol, and clove oil. Whenever possible, products with standardized, known concentrations of essential oils should be used so that accurate dosing is possible. Concentrations required for anesthesia will vary depending on species and other factors, but may be as low as 17 mg/L for some species. Greater concentrations (10 times the upper range for anesthesia) will be required for euthanasia.<sup>298,313-315</sup> These oils are not very water soluble; injecting the solution through a syringe and fine-gauge needle under the water in the container used for euthanizing is helpful in ensuring dispersal in the water. Fish should be left in the anesthetic solution for a minimum of 10 minutes after cessation of opercular movement. These compounds are equivocal or known carcinogens according to the National Toxicology Program.<sup>316</sup> Some studies in rodents indicate this group of anesthetics may cause paralysis in addition to having anesthetic effects, and analgesic properties are unknown.<sup>70,317-319</sup> The FDA strictly prohibits the use of clove oil and eugenol as anesthetics in fish having the potential to enter the food chain, except under Investigational New Animal Drug exemptions.<sup>320</sup> Isoeugenol is a potential carcinogen<sup>316</sup> so human safety in the application of that agent is of concern.
- (5) Isoflurane, sevoflurane. These concentrated liquid anesthetics can be added to water, although they are generally not very water soluble.<sup>302</sup> Injecting the solution through a syringe and fine gauge needle under the water in the container used for euthanizing is helpful in ensuring dispersal in the water. Doses of  $> 5$  to 20 mL/L can be used (10 times the upper range for anesthesia). However, because both anesthetics are highly volatile, human safety is of concern and use in a well-ventilated area is imperative.
- (6) Quinaldine sulfate. Solutions for immersion should be prepared in concentrations  $\geq 100$  mg/L.<sup>321</sup> Quinaldine sulfate will acidify water; therefore, buffering is required to prevent distress from acute drop in pH.
- (7) Tricaine methanesulfonate, buffered (MS 222, TMS). An aversive response to MS 222 has been demonstrated for zebrafish and medaka, while carp, fathead minnow, and rainbow trout showed no aversion.<sup>305,306</sup> Despite evidence of distress and aversion, immersive anesthetics continue to be administered to fish because the benefits associated with their use outweigh any distress and aversion they may cause. Solutions must be buff-

ered, and concentrations required for euthanasia may vary depending upon the species, life stage, and water chemistry parameters. A concentration of 250 to 500 mg/L, or 5 to 10 times the anesthetic dosage, is effective for most species.<sup>298,304</sup> MS 222 at a dose of 400 mg/L has been shown to be ineffective for a few species (eg, Gulf of Mexico sturgeon).<sup>298</sup> A recent study<sup>307</sup> demonstrated that use of buffered MS 222 in a 1-step immersion technique was inadequate for euthanasia of goldfish (*C. auratus*), a hypoxia-tolerant species. Results from this study support the recommendation for use of a 2-step method for euthanasia of goldfish and some other hypoxia-tolerant species, including cichlids, with the first step of involving immersion to render the fish unconscious and the second involving application of an adjunctive method (such as decapitation, pithing, or freezing) to complete euthanasia. Fish that are too large for practical or cost-effective immersion in lethal doses of buffered MS 222 can be euthanized by applying the concentrated, buffered solution directly to the gills.<sup>298,302</sup>

- (8) 2-phenoxyethanol. Solutions for immersion should be prepared in concentrations  $\geq 0.5$  to 0.6 mL/L or 0.3 to 0.4 mg/L.<sup>321</sup>
- (9) Lidocaine. A buffered solution at 400 mg/L is effective for euthanasia of adult zebrafish,<sup>109</sup> but response to lidocaine by immersion varies considerably across species.

**Injection**—Injectable agents have been administered for euthanasia via IV, intracoelomic, IM, and intracardiac routes.<sup>298,308</sup>

- (1) Pentobarbital (1 step). Sodium pentobarbital (60 to 100 mg/kg [27.3 to 45.5 mg/lb]) can be administered by IV, intracardiac, or intracoelomic routes for euthanasia.<sup>251</sup> Pentobarbital may also be administered via intracardiac injection for anesthetized animals as the second step of a 2-step euthanasia procedure. Death usually occurs within 30 minutes.
- (2) Ketamine (2 step). Ketamine may be administered at dosages from 66 to 88 mg/kg<sup>315</sup> (30 to 40 mg/lb) via an IM injection followed by a lethal dose of pentobarbital. Observers should be advised about the possibility of ketamine-induced muscle spasms during induction.<sup>298</sup>
- (3) Ketamine-medetomidine (2 step). A combination of ketamine, at dosages of 1 to 2 mg/kg, with medetomidine, at dosages of 0.05 to 0.1 mg/kg (0.02 to 0.05 mg/lb), may be administered via IM injection followed by a lethal dose of pentobarbital.<sup>315</sup>(4) Propofol (2 step). A dose of 1.5 to 2.5 mg/kg (0.7 to 1.1 mg/lb) can be administered IV followed by an injection of a lethal dose of pentobarbital.<sup>315</sup>

### S6.2.2 PHYSICAL METHODS

The following methods can be applied for euthanasia, providing they are performed with the proper

equipment by trained personnel who are regularly monitored for proficiency.

- (1) Decapitation followed by pithing (2 step). Rapid severance of the head and brain from the spinal cord, followed by pithing of the brain, will cause rapid death and unconsciousness. Decapitation alone is not considered a humane approach to euthanasia, especially for species that may be particularly tolerant of low O<sub>2</sub> concentrations. Pithing helps ensure rapid loss of brain function and death for those species.<sup>322</sup>
- (2) Cervical transection using a knife or other sharp instrument inserted caudal to the skull to sever the spinal cord and cervical vertebrae, followed by pithing (2 step). The rationale for this approach is similar to that for decapitation (destruction of connections between brain and spinal cord) and pithing (destruction of brain tissue), except that the head is still physically attached by musculature to the body.
- (3) Manually applied blunt force trauma (cranial concussion; **Figure 24**) followed by pithing or exsanguination (2 step). Manually applied blunt force trauma (a rapid, accurately placed blow of sufficient energy to the cranium with an appropriate-sized club) can cause immediate unconsciousness and potentially death, but should be followed by pithing or exsanguination to ensure death. The fish's size, species, and anatomy and characteristics of the blow (including its accuracy, speed, and club mass) will determine the efficacy of manually applied blunt force trauma. This procedure requires training and monitoring for proficiency. Anatomic features, such as the location of the eyes, can help serve as a guide to the location of the brain.<sup>322,323</sup>
- (4) Penetrating captive bolt or NPCB (**Figure 25**). These methods are usually applied to large fish species.<sup>322</sup>
- (5) Maceration (1 step). When applied correctly, using a well-maintained macerator specifically designed for the size of fish being euthanized, death is nearly instantaneous.<sup>324</sup> The process is aesthetically unpleasant for some operators and observers.
- (6) Rapid chilling (hypothermic shock; 1 step or 2 step). It is acceptable for zebrafish (*D. rerio*) to be euthanized by rapid chilling (2° to 4°C) until loss of orientation and operculum movements<sup>108,110,111</sup> and subsequent holding times in ice-chilled water, specific to fish size and age. Zebrafish adults (approx 3.8 cm long) can be rapidly killed (10 to 20 seconds) by immersion in 2° to 4°C (36° to 39°F) water. Adult zebrafish should be exposed for a minimum of 10 minutes and fry 4 to 7 dpf for at least 20 minutes following loss of operculum movement to ensure death. Use of rapid chilling and use of buffered MS 222 alone have been shown to be unreliable euthanasia methods for zebrafish embryos < 3 dpf. To ensure embry-

onic lethality these methods should be followed with an adjunctive method such as use of dilute sodium or calcium hypochlorite solution at 500 mg/L.<sup>111,115</sup> If necessary to ensure death of other life stages, rapid chilling may be followed by either an approved adjunctive euthanasia method or a humane killing method. Until further research is conducted, rapid chilling is acceptable with conditions for other small-bodied, similarly sized tropical and subtropical stenothermic species. Species-specific thermal tolerance and body size will determine the appropriateness and effectiveness of rapid chilling for euthanasia of fish. Fish size is important because the rate of heat loss via thermal conduction from a body is proportional to its surface area. Based on these 2 factors, it has been suggested that rapid chilling in water associated with an ice slurry is a suitable killing method for small tropical and subtropical fish species 3.8 cm in length (tip of the snout to the posterior end of the last vertebra) or smaller, having lower lethal temperatures above 4°C.

To ensure optimal hypothermal shock (ie, rapid killing), transfer of fish into ice water must be completed as quickly as possible. This means rapid transitions from acclimatization temperature to 2° to 4°C must be achieved. This can be accomplished by using minimal water volume to transfer fish (ie, using a net to place fish in chilled water). In addition, fish should not be in direct contact with the ice in the water; rather a depression should be formed in the ice slurry to expose the entire surface of the fish to the chilled water. Full contact with cold water ensures optimal exposure and rapid chilling of the fish. Water temperature must not exceed 2° to 4°C. Well-insulated containers, such as coolers, will assist in maintaining the ice slurry and a probe thermometer can be used to confirm water temperature.

This method of euthanasia is not appropriate for temperate, cool, or cold-water-tolerant fish, such as carp, koi, goldfish, or other species that can survive at 4°C and below. It is appropriate for zebrafish and other small-bodied (3.8-cm-long or smaller) tropical and subtropical stenothermic fish, for which the lower lethal temperature range is above 4°C.<sup>108,110,111</sup> This method can also be acceptable for small to medium-sized (2.8- to 13.5-cm-long) Australian river gizzard shad, as long as secondary euthanasia methods are applied after fish are rendered nonresponsive.<sup>110</sup> However, because of surface-to-volume considerations, use of this method is not appropriate in other medium- to large-bodied fish until data regarding its applicability to euthanasia for those species become available.

### **S6.2.3 ADJUNCTIVE METHODS**

Decapitation, pithing, exsanguination, freezing, and other physical or chemical methods for destroying brain function may be used as the second step of a 2-step procedure when fish have been rendered

unconscious prior to their application by an acceptable or acceptable-with-conditions, first-step method. If necessary to ensure death, rapid chilling for specified groups may be followed by an approved adjunctive euthanasia method. Use of a dilute sodium hypochlorite or calcium hypochlorite solution may be an adjunctive method for early life stages of fish, including embryos and larvae.<sup>108,115</sup>

### **S6.2.4 UNACCEPTABLE METHODS**

The following are unacceptable methods of euthanasia in any situation. Flushing of fish into sewer, septic, or other types of outflow systems is unacceptable for many reasons. Water chemistry and quality may delay time to death and result in exposure to noxious compounds. For systems in close proximity to and/or connected to natural waterways, pathogen release or transmission may occur from diseased or carrier animals. Slow chilling or freezing of unanesthetized animals, including placing fish into a freezer without prior anesthesia, is also an unacceptable method. Similarly death by anoxia and desiccation after removal from the water or by anoxia in water; any death due to exposure to caustic chemicals; and death including prolonged traumatic injury prior to unconsciousness are unacceptable.

While metomidate has been used for euthanasia of some finfish species, its listing in the Index of Legally Marketed Unapproved New Animal Drugs for Minor Species by the FDA (with a specified use for sedation and anesthesia) means that its extralabel use for euthanasia is currently illegal.

### **S6.2.5 LIFE STAGE CONSIDERATIONS**

The effectiveness of euthanasia methods described in these guidelines may vary by life stage, as well as by species. Early stages in the lives of fish, including embryos and larvae, may require higher concentrations of immersion anesthetics or a longer duration of exposure.<sup>303</sup> As an example, immersion in a buffered MS 222 solution having a concentration > 1 g/L is not a reliable method for killing some fish in younger life stages.<sup>108,111,303</sup> For some species and in some situations, adjunctive methods to guarantee death may need to be applied for these animals after anesthesia with buffered MS 222. Rapid chilling followed by an adjunctive method such as immersion in a dilute sodium hypochlorite or calcium hypochlorite solution is acceptable for zebrafish embryos and larvae as a 2-step method and is also acceptable with conditions as a 2-step method for destruction of other (nonzebrafish) species' embryos and larvae.<sup>111,115</sup>

### **S6.2.6 FINFISH IN PARTICULAR ENVIRONMENTS**

**S6.2.6.1 Veterinary private practice—companion and ornamental (display) fish**

Clients with pet or display fish of any species often value them as companion animals and share a

human-animal bond similar to that seen between clients and other pets, such as dogs and cats. Therefore, it is important to consider the perception of the client when euthanasia methods are chosen. Clients should be offered the opportunity to be present during euthanasia whenever feasible; however, clients also should be educated as to what method will be used and what they may observe during euthanasia. For example, clients may believe the excitement phase of anesthesia, which can result in increased motor activity or the appearance of agitation,<sup>302</sup> is unduly painful or stressful for the fish even when it is not.

The following methods are acceptable for use in this environment:

- (1) Immersion in solutions of buffered MS 222, buffered benzocaine, isoflurane and sevoflurane, quinaldine sulfate, and 2-phenoxyethanol.
- (2) Injections of pentobarbital, ketamine followed by pentobarbital, a combination of ketamine and medetomidine followed by pentobarbital, and propofol followed by pentobarbital. Owners should be advised about the possibility of ketamine-induced muscle spasms during induction when using that agent.

The following methods are acceptable with conditions for use in this environment:

- (1) Immersion in eugenol, isoeugenol, or clove oil. Fish should be left in the solution for a minimum of 10 minutes after cessation of opercular movement.<sup>298,302</sup>

The following methods are not recommended for use in this environment:

- (1) Immersion in CO<sub>2</sub>-saturated water is not recommended because some fish exposed to this method may become hyperactive, which can be disconcerting for staff and owners.
- (2) Manually applied blunt force trauma to the head, decapitation, and pithing are not recommended because their application can be distressing for owners and staff.

Early stages in the lives of fish, including embryos and larvae, may require higher concentrations of immersion anesthetics or a longer duration of exposure.<sup>303</sup> As an example, immersion in a buffered MS 222 solution having a concentration > 1 g/L is not a reliable method for killing some fish in early life stages.<sup>108,111,303</sup> For some species and in some situations, adjunctive methods to guarantee death may need to be applied for these animals after anesthesia with buffered MS 222.

Rapid chilling followed by immersion in a dilute sodium hypochlorite or calcium hypochlorite solution is acceptable for zebrafish embryos and larvae as a 2-step method and is also acceptable with conditions as a 2-step method for destruction of other (non-zebrafish) species' embryos and larvae.<sup>111,115</sup>

#### S6.2.6.2 Aquarium fish wholesale and retail facilities

Freshwater and marine aquarium fish are commercially collected from the wild, and are also bred

in captivity. Tropical aquarium fish are sold at retail pet shops and fish stores from systems housing 1 or more species of fish per tank. Individual fish or populations of fish may become injured or diseased and require euthanasia. Methods of euthanasia used in this environment need to be applicable to individual fish, to all fish in an aquarium, to fish held in multiple aquariums on a central filtration system, or for fish ponds. In certain situations euthanasia may not be feasible and depopulation methods may be required.

The following methods are acceptable for use in this environment:

Immersion in solutions of buffered MS 222, buffered benzocaine, ethanol, and quinaldine sulfate. Fish should be left in the anesthetic solution for 30 minutes after cessation of opercular movement.<sup>251,298,302</sup>

The following methods are acceptable with conditions for use in this environment:

- (1) Immersion in CO<sub>2</sub>-saturated water (as long as observers are advised and can accept that some fish exposed to this method may exhibit hyperactivity and appear to be in distress); immersion in a eugenol, isoeugenol, or clove oil solution; or immersion in an ethanol solution.
- (2) Decapitation, cervical transection, or manually applied blunt force trauma as step 1 of a 2-step method, followed by pithing.
- (3) Freezing may be used as an adjunctive method of euthanasia following anesthesia.
- (4) Rapid chilling (hypothermic shock) for small-bodied (3.8-cm-long or smaller) tropical and subtropical stenothermic fish, for which the lower lethal temperature range is above 4°C.<sup>108,110,111</sup>

The following methods are not recommended for use in this environment:

Use of injectable anesthetic drugs including barbiturates, especially for larger species, requires the oversight of a veterinarian and DEA permitting for controlled substances. Therefore, unless a veterinarian is available on-site to oversee use of these drugs, this method is not recommended in this environment.

Early stages in the lives of fish, including embryos and larvae, may require higher concentrations of immersion anesthetics or a longer duration of exposure.<sup>303</sup> As an example, immersion in a buffered MS 222 solution having a concentration > 1 g/L is not a reliable method for killing some fish in early life stages.<sup>108,111,303</sup> For some species and in some situations, adjunctive methods to guarantee death may need to be applied for these animals after anesthesia with buffered MS 222.

Rapid chilling followed by immersion in a dilute sodium hypochlorite or calcium hypochlorite solution is acceptable for zebrafish embryos and larvae as a 2-step method and is also acceptable with conditions as a 2-step method for destruction of other (non-zebrafish) species' embryos and larvae.<sup>111,115</sup>

#### S6.2.6.3 Research facilities

Researchers working in laboratories should have

materials readily available to provide appropriate euthanasia for their research subjects when required, and should be trained and monitored for proficiency in the use of chosen techniques. Many facilities using fish as research subjects are engaged in biomedical research. Zebrafish are the most common species used for research and are usually kept in small-scale tank systems; however, some research facilities may also have large-scale housing and production systems or keep other larger species of fish and, consequently, may need to consider additional options for euthanasia.<sup>272</sup> The expertise of those knowledgeable about these settings and species should be sought as necessary.

The following methods are acceptable for use in this environment:

- (1) Immersion in solutions of buffered MS 222, buffered benzocaine, lidocaine, quinaldine sulfate, and 2-phenoxyethanol. Fish euthanized with these methods are not approved for use as human food.
- (2) Rapid chilling (hypothermic shock) is acceptable for zebrafish (*D rerio*) and Australian river gizzard shad (*N erebi*) as long as transfer from acclimatized temperatures to water associated with a 2° to 4°C ice slurry occurs rapidly with as little transfer of warmer water as possible.

The following methods are acceptable with conditions for use in this environment:

- (1) Immersion in CO<sub>2</sub>-saturated water (as long as observers are advised and can accept that some fish exposed to this method may exhibit hyperactivity and appear to be in distress) or immersion in a eugenol, isoeugenol, or clove oil solution.
- (2) Rapid chilling (hypothermic shock) to 2° to 4°C is acceptable with conditions for small-bodied (3.8-cm-long or smaller) tropical and subtropical stenothermic fish, for which the lower lethal temperature range is above 4°C. Because of surface-to-volume considerations, use of this method is not appropriate for other medium- to large-bodied fish until additional data for those species become available.
- (3) Maceration is acceptable with conditions when death is instantaneous from using a well-maintained macerator designed for the size of fish being euthanized. The process is likely to be aesthetically unpleasant for those observing it.
- (4) Decapitation followed by pithing. Rapid severance of the head and brain from the spinal cord, followed by pithing of the brain, will cause rapid death and unconsciousness.<sup>272</sup>
- (5) Manually applied blunt force trauma (cranial concussion) followed by pithing or exsanguination.

Early stages in the lives of fish, including embryos and larvae, may require higher concentrations of immersion anesthetics or a longer duration of exposure.<sup>303</sup> As an example, immersion in a buffered MS 222 solution having a concentration > 1 g/L is not a reliable method for killing some fish in earlier life stages.<sup>108,111,303</sup> For some species and in some situa-

tions, adjunctive methods to guarantee death may need to be applied for these animals after anesthesia with buffered MS 222.

Rapid chilling followed by immersion in a dilute sodium hypochlorite or calcium hypochlorite solution is acceptable for zebrafish embryos and larvae as a 2-step method and is also acceptable with conditions as a 2-step method for destruction of other (nonzebrafish) species' embryos and larvae.

#### S6.2.6.4 Fish kept outdoors and in fisheries

Field research on fish takes place in a complex environment that must be understood by both researchers and their respective IACUC.<sup>272</sup> Field research is frequently conducted on a scale comparable to commercial fishing, often with the same equipment, boats, and personnel. The large number of fish, limited boat space, adverse environmental conditions, and personnel safety concerns may justify use of harvest techniques that may not meet the criteria for euthanasia, but in all situations, pain and distress should be minimized to the greatest extent possible. Similarly, fisheries biologists may be faced with situations involving numerous fish requiring depopulation (eg, invasive species) rather than euthanasia.

Fieldwork on fish may also be conducted on a smaller scale under conditions that make euthanasia feasible. In such cases, the following methods should be applied and convenience for the researcher should not be a primary consideration.

The following methods are acceptable for use in this environment:

- (1) Immersion in solutions of buffered MS 222, buffered benzocaine, quinaldine sulfate, isoflurane or sevoflurane, ethanol, quinaldine sulfate, and 2-phenoxyethanol. Although a general concern for all environments and situations, the potential effects of drug residues and proper disposal of animal remains should be considered when using any of these drugs.
- (2) An injection of pentobarbital (60 to 100 mg/kg) can be administered IV or intracoelomically.<sup>321</sup> Pentobarbital may also be administered intracardially in anesthetized animals. Two-step injection procedures may also be used, including ketamine (IM) followed by a lethal dose of pentobarbital; a combination of ketamine and medetomidine (IM) followed by a lethal dose of pentobarbital; and propofol (IV) followed by a lethal dose of pentobarbital. Although a general concern for all environments and situations, the potential effects of drug residues and proper disposal of animal remains should be considered when using any of these drugs.

The following methods are acceptable with conditions for use in this environment:

- (1) Immersion in CO<sub>2</sub>-saturated water (as long as observers are advised and can accept that some fish exposed to this method may exhibit hyperactivity and appear to be in distress) or immersion in a eugenol, isoeugenol, or clove oil solution.

- (2) Manually applied blunt force trauma to the head followed by pithing or exsanguination.
- (3) Decapitation followed by pithing. Decapitation alone is not considered a humane form of euthanasia, especially for species that may be particularly tolerant of low O<sub>2</sub> concentrations. Pithing helps ensure rapid death for those species.
- (4) Cervical transection followed by pithing or exsanguination. The rationale for this approach is similar to that for decapitation and pithing, except that the head is still physically attached by musculature to the body.
- (5) Captive bolt. This method is usually applied to large fish species.
- (6) Rapid chilling (hypothermic shock) in water of 2° to 4°C for small-bodied (3.8-cm-long or smaller) tropical and subtropical stenothermic species (as previously described for zebrafish). Because of surface-to-volume considerations, use of this method is not appropriate in medium- to large-bodied fish until pertinent data for those species become available.

Early stages in the lives of fish, including embryos and larvae, may require higher concentrations of immersion anesthetics or a longer duration of exposure.<sup>303</sup> As an example, immersion in a buffered MS 222 solution having a concentration > 1 g/L is not a reliable method for killing some fish in early life stages.<sup>108,111,303</sup> For some species and in some situations, adjunctive methods to guarantee death may need to be applied for these animals after anesthesia with buffered MS 222. Rapid chilling followed by immersion in a dilute sodium hypochlorite or calcium hypochlorite solution is acceptable for zebrafish embryos and larvae as a 2-step method and is also acceptable with conditions as a 2-step method for destruction of other (nonzebrafish) species' embryos and larvae.<sup>111,115</sup>

## S6.3 AQUATIC INVERTEBRATES

Overdose of a general anesthetic is as appropriate a euthanasia strategy for aquatic invertebrates as it is for fish. And, immersion is an effective route of administration of anesthetic and euthanasia agents.<sup>325,326</sup>

Because confirming the death of many invertebrates is difficult, 2-step euthanasia procedures are often recommended in which chemical induction of anesthesia, nonresponsiveness, or presumptive death is followed by an adjunctive method that destroys the brain or major ganglia physically (eg, pithing, freezing, boiling) or chemically (eg, alcohol, formalin). Application of the latter methods by themselves is generally not considered to meet the criteria established for euthanasia.<sup>325,326</sup>

### S6.3.1 ACCEPTABLE FIRST STEPS OF 2-STEP METHODS

#### S6.3.1.1 Noninhaled agents for immersion

*Magnesium salts*—Magnesium salts are a near-universal anesthetic agent, relaxing agent, and eutha-

nasia agent for aquatic invertebrates, although they are ineffective for crustaceans. Research indicates the magnesium ion acts centrally and also blocks both afferent and efferent nerve transmission in suppressing neural activity of cephalopods.<sup>327,328</sup> A range of concentrations has been recommended for various phyla. A stock solution of MgCl<sub>2</sub>·6H<sub>2</sub>O at a concentration of 7.5% (75 g/L, about 370mM in deionized water) is nearly isosmotic with seawater and can be added to water in increasing ratios up to 1:1 stock solution volume to water volume (3.75%, 37.5 g/L, about 185 mM) or higher to effect euthanasia.<sup>329,330</sup> A direct addition of magnesium salts to seawater results in a hyperosmotic solution.<sup>331</sup> Magnesium salts may be combined with ethanol for euthanasia of cephalopods.<sup>331</sup> Immersion for at least 15 minutes is recommended for cephalopods, as is an adjunct method like decerebration at least 5 minutes after respiratory arrest or after the animal is insensible.<sup>328,330</sup> At least 30 minutes' immersion is recommended if brain destruction is not an option.<sup>330</sup> Species susceptibility to the effects of magnesium salts varies.<sup>329,330</sup>

*Clove oil or eugenol*—Clove oil or eugenol has been used effectively as an immersion agent for the euthanasia of some crustaceans (0.125 mL/L).<sup>325,332</sup> Isoeugenol is a potential carcinogen<sup>316</sup> so human safety in the application of that agent is of concern.

*Ethanol*—Ethanol has been used for euthanasia of some phyla, acting by inhibiting neuronal sodium and calcium channels in molluscs.<sup>309</sup> It inhibits both afferent and efferent nerve transmission in cephalopods.<sup>328</sup> Initial aversion and excitement have been reported as occurring in some but not all cephalopods.<sup>327,333,334</sup> It is used at a concentration of 1% to 5% (10 to 50 mL/L)<sup>328,335</sup> up to 10%,<sup>329</sup> in contrast with concentrations of > 70% used for preservation, and may be less effective at cooler temperatures.<sup>334</sup> It is recommended that ethanol be added slowly with mixing.<sup>329</sup> Ethanol may be combined with a magnesium salt solution for euthanasia of cephalopods.<sup>331</sup> Immersion of at least 10 minutes followed by an adjunctive method such as decerebration is recommended.<sup>330</sup> Species susceptibility to the effects of ethanol varies.<sup>330</sup>

Other agents for euthanasia, while less common, have been described and may be useful for specific applications.<sup>325,329</sup>

### S6.3.2 ACCEPTABLE SECOND STEPS OF 2-STEP METHODS

#### S6.3.2.1 Noninhaled agents for immersion

Noninhaled agents that can be administered via immersion as the second step of a 2-step euthanasia approach include 70% alcohol and neutral-buffered 10% formalin. These agents are not acceptable, however, for immersion as a single-step procedure, nor as the first step of a 2-step procedure.

#### S6.3.2.2 Physical methods

Pithing, freezing, and boiling are acceptable as the second step (adjunctive methods) of a 2-step eu-

thanasia procedure. Pithing requires detailed anatomic knowledge of the species in question. These methods are not acceptable, however, as a single-step procedure, nor as the first step of a 2-step procedure.

### **S6.3.3 LIFE STAGE CONSIDERATIONS**

The effectiveness of euthanasia methods described in the Guidelines may vary depending on life stage and species. As for fish, this should be considered when euthanizing aquatic invertebrates. Methods used for different life stages of the same species may require modification to maximize their effectiveness. Recommendations regarding use of adjunctive methods (as described previously) may also be necessary to guarantee death.

### **S6.3.4 UNACCEPTABLE METHODS**

Methods of killing that do not cause rapid death or that cause trauma prior to loss of consciousness are not considered humane methods of death, or euthanasia.

These can include removing a fish or aquatic invertebrate from the water and allowing it to die by hypoxia secondary to desiccation of gill tissue; leaving fish or aquatic invertebrates in a container of water without adequate aeration, causing death by anoxia; or any death due to exposure to caustic chemicals or traumatic injury without first inducing unconsciousness in the fish or aquatic invertebrate.

## **S7 Zoologic and Free-Ranging Nondomestic Animals**

Methods acceptable with conditions are equivalent to acceptable methods when all criteria for application of a method are met.

### **S7.1 GENERAL CONSIDERATIONS**

The nondomestic captive and free-ranging animals discussed in the following sections vary substantially in their anatomic and physiologic characteristics, native environment, behavior, social structure, responses to humans, and other traits. These variations challenge the application and effectiveness of euthanasia methods for the many different species. The efficacy of these methods can be further limited by the circumstances under which euthanasia is performed. Consequently, the best means of terminating an animal's life might not strictly conform to the definition of euthanasia. For nondomestic captive or free-ranging animals, the methods selected will often be situation specific, as a means of minimizing potential risks to the animal's welfare and personnel safety. In addition, challenges associated with disposal of the remains of animals with drug residues that have been addressed in the section of the document on Disposal of Remains (eg, secondary toxicosis, environmental contamination, and other topics) are relevant to disposal of the remains of nondomestic animals, particularly under field conditions. Given the

complexity of issues that euthanasia of nondomestic animals presents, personnel are encouraged to consult references on anatomy, physiology, natural history, husbandry, and other disciplines that will aid in understanding how various methods may impact an animal's euthanasia experience.<sup>95,271,336-338</sup> Consultation with experienced colleagues is recommended, particularly when novel circumstances and/or species are encountered.

Animals may become distressed due to physical discomfort, anxiety in atypical social settings and physical surroundings, pheromones or odors from nearby or previously euthanized animals, and the presence of humans. In addition, human safety, observers' perceptions, availability of trained personnel, potential infectious disease concerns, conservation and other population objectives, regulatory oversight that may be species specific, available equipment and facilities, options for disposal, potential secondary toxicity, research objectives, and other factors must be considered. Human safety is of utmost importance for all euthanasia procedures, and appropriate protocols and equipment (including supplies for addressing human injury due to animal handling or exposure to immobilizing drugs) must be available prior to handling animals.<sup>339</sup> Laws and regulations pertaining to the species being euthanized, the euthanasia methods employed, and disposal of the remains must be followed.

Euthanasia of captive wild animals requires consideration of basic stewardship, physiologic and behavioral variation, and relief from pain and anxiety. Management can be guided by the physical and social setting the animal is in (eg, small enclosures, seminatural conditions), the animal's temperament, seasonal factors (eg, reproductive stage, physical condition, age and size), and differences from similar domestic species. Appropriate handling and modifying the animal's physical and social environment to minimize distress, as well as administration of anxiolytics, are recommended. Provision of preferred bedding, temperature, humidity, and security in the period leading up to euthanasia will allow the animal to be as comfortable as possible. Most small animals will find security in a dimly lighted, appropriately bedded and ventilated crate, box, tube, or similar container as this simulates a natural tendency to hide from perceived threats. Some species respond well to being left within typical social groups or familiar surroundings as long as possible prior to euthanasia to minimize anxiety.

Best practice for many captive wild animal species includes a multistep approach, beginning with administration of a sedative or anesthetic to relieve anxiety and pain. For wild animals in captivity, physical and/or chemical restraint is usually required before euthanasia can be performed. Physical restraint is appropriate when skilled staff, facilities, suitable equipment, and the animal's characteristics allow rapid immobilization with minimal distress.<sup>339</sup> Refer-



ences should be consulted for appropriate doses of anesthetics and anxiolytics and preferred routes of administration.<sup>8,340–342</sup> Animals can be premedicated via IM injection and/or orally. Intravenous administration of drugs is generally difficult without physical or chemical restraint. Chamber delivery of inhaled agents having little odor, such as sevoflurane, allows for induction of anesthesia in smaller species with minimal stress. Injectable anesthesia can be momentarily painful or discomforting during or immediately after administration due to a combination of volume, formulation, and route of administration, as well as the distress associated with physical restraint. The advantages and disadvantages of administering anxiolytics, anesthetics, or other drugs and applying physical restraint should be balanced against the benefit of providing a swift death to end suffering. Research is needed to improve the euthanasia options available for some taxonomic groups and circumstances.

## S7.2 CAPTIVE INVERTEBRATES

Invertebrates comprise more than 95% of the animal kingdom's species and include unrelated taxonomic groups: spiders (Araneae),<sup>343</sup> centipedes and millipedes (Myriapoda), insects (Hexapoda),<sup>344</sup> and many others. Terrestrial invertebrates play important roles in laboratory research, as display animals, and as companions in the home. Despite their varied roles, limited guidance is available on appropriate methods by which invertebrates may be euthanized.<sup>251,336,345–347</sup> This is due, in part, to a lack of coverage under animal welfare regulations applicable to animals used for research and other purposes in the United States and other countries.<sup>333,348</sup> Diversity in anatomic, physiologic, and other characteristics limits generalizations across taxa.<sup>349</sup> Of particular relevance are differences in innervation and circulatory systems, some of which do not have close correlates in familiar vertebrate systems. This creates challenges for developing humane means of terminating invertebrates' lives.

While there is ongoing debate about invertebrates' abilities to perceive pain or otherwise experience compromised welfare, the Guidelines assume that a conservative and humane approach to the care of any creature is warranted and expected by society. Consequently, euthanasia methods should be used that minimize the potential for pain or distress. Most commonly used methods involve terminal anesthesia, followed by physical destruction of the nervous system, to assure lack of sensory perception and death of the animal. The diversity of invertebrate taxa may require equally diverse approaches to euthanasia.

### S7.2.1 ACCEPTABLE METHODS

#### S7.2.1.1 Noninhaled agents

*Injectable agents*—While there is little dosing or outcome data in the peer-reviewed literature, an overdose of pentobarbital or similar agent, at a dose equivalent to that used for other poikilotherm verte-

brates (piscine, amphibian, or reptilian) on a weight-to-weight basis, will generally suffice. Ideally these agents will be injected directly into the circulating hemolymph. However, because many invertebrates have an open circulatory system, true intravascular application can be difficult if not impossible. In such cases an intracoelomic injection would be warranted unless otherwise contraindicated. Premedication with an injectable or inhaled agent may facilitate administration of barbiturate overdoses.

### S7.2.2 ACCEPTABLE WITH CONDITIONS METHODS

#### S7.2.2.1 Inhaled agents

*Inhaled anesthetics*—Overdose of an inhaled anesthetic is acceptable with conditions for terrestrial invertebrates where injectable agents are not available. Because confirming death of many species of invertebrates can be difficult, subsequent use of an adjunctive method of euthanasia is recommended.

*Carbon dioxide*—Carbon dioxide may be useful for euthanasia of some terrestrial invertebrates, but additional information is needed to confirm its efficacy.

#### S7.2.2.2 Acceptable first steps of 2-step methods

Two-step euthanasia procedures, as described for aquatic invertebrates, are acceptable for some or many species of invertebrates. Recent research documented the efficacy of immersion in 5% laboratory-grade ethanol or an undiluted, uncarbonated beer (5% ethanol content) served to anesthetize land snails (*Succinea putris*) without signs of distress as a first-step procedure.<sup>335</sup> This was followed by immersion in solutions of 70% to 95% ethanol or neutral-buffered 10% formalin that served to euthanize snails and preserve tissue. Further research is needed to establish the general validity of applying this 2-step method and other methods to terrestrial invertebrate species.

#### S7.2.2.3 Physical and chemical methods

Physical (eg, boiling, freezing, pithing) and chemical (eg, alcohol, formalin) methods act by destroying the brain or major ganglia. Physical and chemical methods should be applied adjunctively, following pharmaceutical or other chemical induction of anesthesia, nonresponsiveness, or presumptive death. These methods are not considered to be humane as sole methods of euthanasia.<sup>345,346,350,351</sup>

*Pithing*—This method requires detailed anatomical knowledge of the species in question.

### S7.2.3 UNACCEPTABLE METHODS

Because information on the physiologic responses of invertebrates to many methods of euthanasia is not available at this time, comments regarding unacceptable methods of euthanasia are limited to those that should not be applied as sole methods of euthanasia (see comments under Acceptable With Conditions Methods).

## **S7.2.4 DEVELOPMENTAL STAGES OF INVERTEBRATES**

Recommendations for euthanasia of invertebrates in developmental stages are currently not available.

## **S7.3 CAPTIVE AMPHIBIANS AND REPTILES**

### **S7.3.1 ANATOMY AND PHYSIOLOGY**

Amphibians and reptiles include caecilians (order Gymnophiona), frogs (order Anura), salamanders (order Caudata), snakes (suborder Serpentes), lizards (suborder Lacertilia), crocodilians (order Crocodylia), and turtles and tortoises (superorder Chelonia). Once again, these taxonomic groups differ substantially anatomically and physiologically from each other, as well as from mammals. Of particular concern for amphibians and reptiles are differences in metabolism and high tolerances to hypoxia, as compared with mammals, that limit the effectiveness of methods based on anoxia. In addition, consistent access to the vasculature can be challenging and, therefore, many conventional methods of euthanasia are less efficacious for these species. Because it is often difficult to confirm that an amphibian or reptile is dead, the application of 2 or more euthanasia procedures is usually recommended.<sup>293,352-354</sup>

Our understanding of amphibians' and reptiles' nociception and responses to stimuli is incomplete; therefore, many recommendations for minimizing pain and distress are extrapolated from information available about mammals. Where uncertainty exists, erring to proactively alleviate potential pain and suffering is recommended as an appropriate approach to euthanizing amphibians and reptiles. Consulting multiple references on amphibian and reptile euthanasia is advised as a means of identifying methods that are most appropriate for a given species and set of circumstances.<sup>116,293,294,352-356</sup>

### **S7.3.2 RESTRAINT**

*Physical restraint*—Manual restraint is possible for many species. Equipment may be required for restraint of some species in some situations (eg, venomous species). Multiple people may be required for larger species, and at least 1 additional person should be available for emergencies. Large animals may represent a proportionately greater risk for personnel.

*Chemical restraint*—Chemical restraint may be useful in some situations, particularly for venomous or large animals where human safety would be compromised by manual restraint. Chemical restraint at high doses may serve as a first or preparatory step of euthanasia in some situations.

### **S7.3.3 VERIFICATION OF DEATH**

Methods used to verify death in mammalian species, such as auscultation, ECG, Doppler ultrasound, or pulse oximetry, can be used for amphibians and reptiles, but it is important to remember that amphibian and reptilian hearts can beat even after brain death. Death should always be confirmed by physical intervention.

ian and reptilian hearts can beat even after brain death. Death should always be confirmed by physical intervention.

### **S7.3.4 ACCEPTABLE METHODS**

#### **S7.3.4.1 Noninhaled agents**

*Injectable agents*—Venous access for administration of euthanasia agents can be challenging for some species. Intracoelomic, subcutaneous lymph spaces, and lymph sacs are acceptable routes of administration. Direct injection into the brain through the parietal eye, while under anesthesia, has been described for some lizard species.<sup>357</sup>

Sodium pentobarbital (60 to 100 mg/kg of body weight) can be administered IV, intracoelomically, in the subcutaneous lymph spaces, or in the lymph sacs, although doses vary by species.<sup>358</sup> Doses as high as 1,100 mg/kg (500 mg/lb) of sodium pentobarbital with sodium phenytoin administered intracoelomically may be required for euthanasia of some species such as *X laevis*.<sup>116</sup> Time to effect may vary, with death occurring instantaneously or up to 30 minutes later.<sup>293,352-354,359,360</sup> Barbiturates are best administered intravascularly to minimize the discomfort upon injection.<sup>361</sup> However, where intravascular administration is not possible or its benefits are outweighed by distress imposed by additional restraint, pain from alternate methods, risk to personnel, or other similar reasons, intracoelomic administration is an acceptable route for administration of barbiturates.

Dissociative agents such as ketamine hydrochloride or combinations such as tiletamine and zolazepam; inhaled agents; and IV administered anesthetics, such as propofol, or other ultra-short-acting barbiturates, may be used for poikilotherms to induce rapid general anesthesia and subsequent euthanasia, although application of an adjunctive method to ensure death is recommended.

*External or topical agents*—Buffered MS 222 may be administered via water baths (amphibians), or injected directly into the lymph sacs (amphibians) or the coelomic cavity (small amphibians and reptiles).<sup>362-365</sup> Prolonged immersion (as long as 1 hour) may be required for 5- to 10-g/L water baths.<sup>116,358</sup> Tricaine methanesulfonate does not create histopathologic artifacts.<sup>362</sup> See the Noninhaled Agents section of the Guidelines for additional information.

Benzocaine hydrochloride, a compound similar to MS 222, may be used as a bath or in a recirculation system at concentrations  $\geq$  250 mg/L or applied topically to the ventrum as a 7.5% or 20% gel for euthanasia of amphibians.<sup>366</sup> A dose of 182 mg/kg of benzocaine gel (20% concentration, 2.0-cm X 1.0-mm application) has been reported as effective for euthanasia of adult *X laevis*.<sup>116</sup> Pure benzocaine is not water soluble and should be avoided for anesthesia or euthanasia because it requires the use of acetone or ethanol solvents, which may be irritating to tissues.<sup>367</sup>

In general, these noninhaled agents are highly effective, their onset of action is rapid, and they are ap-

plicable across a range of species and sizes of animals. However, general anesthesia may be required prior to administration, some require IV administration for vessels that may be difficult to access, they may produce undesirable tissue artifacts, a controlled substance license is required for barbiturates and some other products, and there may be environmental pollution and toxicity concerns depending on method of disposal of the remains.

### **S7.3.5 ACCEPTABLE WITH CONDITIONS METHODS**

#### **S7.3.5.1 Inhaled agents**

*Inhaled anesthetics*—Inhaled anesthetics are acceptable with conditions when they are more practical than the previously mentioned acceptable methods, and where the limitations of this method are understood and addressed. Many reptiles and amphibians are capable of breath holding and shunting of their blood, which permits conversion to anaerobic metabolism for survival during prolonged periods of anoxia (up to 27 hours for some species).<sup>368-373</sup> Because of this, induction of anesthesia and time to loss of consciousness may be greatly prolonged when inhaled agents are used. Death may not occur even with prolonged exposure.<sup>293,352-354</sup> Lizards and most snakes do not hold their breath to the same extent as some of the chelonians, and are therefore more likely to have a clinical response to inhaled agents. Regardless of the species or taxonomic group, death must be verified prior to terminating the use of the inhaled agent, or a second, guaranteed lethal procedure (eg, decapitation) should be performed to ensure death.

Inhaled anesthetics are effective, have a moderately rapid onset, appear to induce a painless death, can maximize use of the euthanized animal for analytical studies, and can minimize the need for animal handling. Caveats include that inhaled anesthetics are most suitable for smaller species, animals may experience an excitation phase prior to becoming anesthetized, they present environmental pollution and occupational hazard concerns, some are irritants or are perceived as noxious, and amphibians and reptiles may be resistant to their action because of breath holding.

*Carbon dioxide*—Carbon dioxide may be considered for euthanasia of amphibians and reptiles if alternate methods are not practical and where the limitations of this method are understood and addressed.<sup>293,294,352-354,356</sup> Due to the potential lack of response to this method by many species and the requirement for a prolonged exposure time, other methods are preferable. Death by CO<sub>2</sub> must be verified, and preferably, assured by application of a secondary lethal procedure.

#### **S7.3.5.2 Physical methods**

*PCB or firearm*—Crocodilians and other large reptiles can be euthanized by a PCB or gunshot (free bullet) delivered to the brain.<sup>355,374</sup> Nonpenetrating captive bolt can be effective for euthanasia of Ameri-

can alligators<sup>374</sup> that are 5 to 15 kg (11 to 33 lb), and further research is needed to establish this method's general applicability to large reptilian and amphibian species. Line drawings of the head of various amphibians and reptiles, with recommended locations for captive bolt or firearm projectile penetration, are available (**Figure 26**).<sup>356</sup> Refer to ballistics details in the Physical Methods section and experts for more information on selection and use of firearms.

These methods are moderately rapid (allowing for restraint), are applicable across a wide range of species and sizes, and leave no environmental residues other than lead (in the case of free bullet), which can be sequestered. However, size-appropriate equipment and appropriately trained personnel are required, violent muscle contractions can occur following their application, and they may be aesthetically unpleasant for onlookers.

*Manually applied blunt force trauma to the head*—This method is acceptable with conditions, when other options are unavailable, as long as it is performed by well-trained and skilled personnel and if an adjunctive method, such as decapitation or pithing, is promptly applied to ensure death.<sup>95,336,352,366</sup> Further research is needed to clarify methods, taxa, and size ranges where this method is effective and humane.

*Rapid freezing*—Reptiles and amphibians can be euthanized by rapid freezing when it results in immediate death. Based on rodent models, it is likely that this can be achieved by placing animals < 4 g (0.1 oz) in liquid N<sub>2</sub>.<sup>95</sup> However, due to a dearth of empirical evidence supporting this method, operators should consider a secondary method to ensure that recovery does not occur. The technique should not be used for species that have adapted freeze tolerance strategies, as this method may not result in instant death.<sup>375</sup> Placement of animals ≥ 4 g in liquid N<sub>2</sub> or other uses of hypothermia are not acceptable.

*Spinal cord severance followed by destruction of brain tissue*—Death can be humanely and effectively induced in 5- to 15-kg American alligators by spinal cord severance promptly followed by pithing of the brain when operators are trained and skilled in the procedure.<sup>374</sup> This method may be appropriate for some sizes of other reptile and amphibian species, but further research is needed to confirm this. Destruction of brain tissue after spinal cord severance can also be achieved by use of PCB or NPCB, and this approach may be less prone to operator error when equipment is in good working order.

### **S7.3.6 ADJUNCTIVE METHODS**

*Decapitation*—After animals have been anesthetized, decapitation using heavy shears or a guillotine is effective for some species. It has been assumed that stopping blood supply to the brain by decapitation causes rapid loss of consciousness. However, because the CNS of reptiles and amphibians is tolerant to hypoxic and hypotensive conditions,<sup>356</sup> decapitation

must be followed by pithing or another method of destroying brain tissue.<sup>352,354,361,374</sup> Decapitation should only be performed as part of a 3-step euthanasia protocol (injectable anesthetic, decapitation, pithing).

**Pithing**—Pithing can be used as a second-step euthanasia method in unconscious animals when performed by properly trained individuals.<sup>352,354</sup> The pithing site in frogs is the foramen magnum, and it is identified by a slight midline skin depression posterior to the skull, midline between the eyes, with the neck flexed.<sup>293,353</sup>

### **S7.3.7 UNACCEPTABLE METHODS**

**Hypothermia**—Hypothermia is an inappropriate method of restraint or euthanasia for amphibians and reptiles unless animals are sufficiently small (< 4 g)<sup>95</sup> to permit immediate and irreversible death if placed in liquid N<sub>2</sub> (rapid freezing).<sup>352,354,361</sup> Hypothermia reduces amphibians' tolerance for noxious stimuli<sup>376,377</sup> and there is no evidence that it is clinically efficacious for euthanasia.<sup>378</sup> In addition, it is believed that freezing can result in the formation of ice crystals in tissues that may cause pain.<sup>95,356</sup> Consequently, because amphibians and reptiles lack behavioral or physiologic means of demonstrating pain or distress while hypothermic, generalized prohibitions on hypothermia for restraint or euthanasia are appropriate. Localized cooling in frogs may reduce nociception, but this localized effect is not appropriately applied to the whole body as a part of euthanasia procedures.<sup>379</sup> Freezing of deeply anesthetized animals may be justified under circumstances where human safety could be compromised.<sup>380</sup>

### **S7.3.8 SPECIAL CASES AND EXCEPTIONS**

Intracardiac administration of euthanasia agents is acceptable for captive amphibians and reptiles that are unresponsive to stimuli because of disease or the application of other euthanasia methods, or in cases where other routes are not possible.

Neuromuscular blocking agents may be used for routine anesthetic procedures of crocodylians and some other taxa and are, therefore, considered acceptable with conditions for restraint of reptiles if given immediately prior to administration of a lethal agent. These agents are not acceptable as a sole means of euthanasia.

Injectable agents such as lidocaine hydrochloride, potassium salts, or magnesium salts may be useful as an adjunctive method to prevent recovery.<sup>354</sup>

Perfusion with fixative of a deeply anesthetized animal can be used to euthanize amphibians and reptiles when scientifically justified.

### **S7.3.9 DESTRUCTION OF VIABLE EGGS**

Little information is available on the sensory capacity of amphibians and reptiles at the egg stage of development.<sup>95</sup> Freezing is likely appropriate for newly oviposited eggs, as would be methods of maceration that result in instantaneous death. Later stages

may be destroyed using methods that are acceptable for adult animals. More research needs to be done to determine the most appropriate methods for disposing of live eggs.

## **S7.4 CAPTIVE NONMARINE MAMMALS**

### **S7.4.1 GENERAL CONSIDERATIONS**

The anatomic, physiologic, behavioral, and size variations of nondomestic mammals far exceed those of their domestic counterparts. This presents challenges for the application of conventional methods of euthanasia and the recognition of anxiety and pain. Differences from similar domestic species must be recognized and addressed as thoroughly as practical when preparing for and performing euthanasia.

In zoos or other captive settings, euthanasia of wildlife is typically performed in the presence of staff members who are responsible for caring for these animals. Consequently, sensitivity to the meaning and value to caregivers of animals in this kind of setting is important. This can be addressed, in part, with attention to stewardship, and relief from pain and anxiety prior to administration of a euthanasia method. Most euthanasia procedures should include the use of inhaled or injectable anesthetics to achieve unconsciousness, followed by use of an approved method to end life.

In some cases animals may experience intolerable suffering, or the situation may not allow for ideal stewardship as a prelude to the act of euthanasia. These situations typically require a more direct approach to limit how much an animal is allowed to suffer. Such situations also require a brief explanation to personnel, where possible, as well as a more complete explanation of the choice of method subsequent to completion of the procedure. Preparing staff ahead of time to be cognizant of the possibility of these kinds of situations will likewise help to better prepare for situations where a more ideal procedure is not feasible.

Alternate approved methods of euthanasia might be applicable if an animal is anesthetized prior to euthanasia. Any candidate method not specifically mentioned in the text that follows should be evaluated conceptually to address good stewardship principles prior to its use.

Following euthanasia, verification of death is important. Methods that can be used for verification of cessation of cardiac function include, but may not be limited to, palpation for a pulse in an appropriate anatomic location based on species, auscultation with a stethoscope, and use of Doppler ultrasound.

### **S7.4.2 RESTRAINT**

**Physical restraint**—Manual restraint is possible for many species. Nets or other equipment may be appropriate for smaller species that do not pose an excessive risk for personnel. For the largest species (hoofstock and megavertebrates), chutes or other

equipment may provide sufficient restraint for IM or IV administration of anesthetics and/or anxiolytics. Brief restraint followed by IV administration of a euthanasia agent may be possible as an approach to euthanasia in some situations. However, administration of a preanesthetic or sedatives before administration of a euthanasia agent should be the default in most cases.

*Chemical restraint*—Chemical restraint may be useful in some situations, particularly for dangerous animals where human safety would be compromised with manual restraint, as well as to reduce unnecessary stress and discomfort for the animal(s). Chemical restraint at high doses may serve as the first step of euthanasia in some situations.<sup>8,340–342</sup>

### **S7.4.3 ACCEPTABLE METHODS**

#### **S7.4.3.1 Noninhaled agents**

*Barbiturates*—Barbiturates may be administered IV or IP. Intracardiac administration must be limited to animals that are unconscious due to disease or the effects of anesthetics. Onset of action is slower with IP administration and premedication with anesthetics may reduce discomfort due to tissue irritation. Barbiturates are best administered intravascularly to minimize discomfort upon injection.<sup>361</sup> However, where intravascular administration is not possible or its benefits are outweighed by distress imposed by additional restraint, pain from alternate methods, risk to personnel, or other similar reasons, IP administration is an acceptable route for administration of barbiturates.

Barbiturates are highly effective as euthanasia agents, have a rapid onset of action, and are applicable across a wide range of species and sizes of animals. However, they do have drawbacks, including that individuals must be trained to correctly administer injections, general anesthesia or sedation with injectable or inhaled agents may be required prior to their administration (depending on the animal and the situation), they can produce undesirable tissue artifacts, a controlled substance license is required for their acquisition, and environmental pollution and toxicity may be of concern depending on the method used to dispose of animal remains.

*Nonbarbiturate anesthetic overdose*—Opioids and other anesthetics may be administered IV or IM for euthanasia when animal size, restraint requirements, or other circumstances indicate these drugs are the best option for euthanasia.

Intramuscular administration of opioids is advantageous when other routes of administration are not available. Opioids tend to have a rapid onset of action, and the volume of drug to be administered may be smaller than for other agents. There are also disadvantages associated with administering an overdose of opioids, including requirements for DEA licensing, risks to human safety if exposure to drugs occurs, and the potential for secondary toxicity if tissues are consumed.

### **S7.4.4 ACCEPTABLE WITH CONDITIONS METHODS**

#### **S7.4.4.1 Inhaled agents**

*Inhaled anesthetics*—Inhaled anesthetics are acceptable with conditions when they are more practical than acceptable methods, and where the limitations of this method are understood and addressed. Inhaled anesthetics may be administered via face mask or chambers. Placing an animal's entire crate into a chamber will allow anesthesia to be induced with the least amount of distress. As discussed in the Inhaled Agents section of the Guidelines, agents with minimal odor are preferred.

Inhaled anesthetics have a moderately rapid onset of action, do not appear to cause pain on administration, maximize the availability of the animal's remains for analytical studies, and can be applied with minimal handling of the animal. They also, however, have some disadvantages in that they are most suitable for smaller species, some are irritants or are perceived as noxious, animals can experience an excitation phase prior to induction of anesthesia, and they may present environmental pollution and occupational safety concerns.

*Carbon monoxide, carbon dioxide, and inert gases*—These agents are acceptable with conditions for application where animal welfare and pragmatic concerns warrant their use and risks to personnel safety can be addressed. For more information, please consult the Guidelines section on Inhaled Agents.

#### **S7.4.4.2 Physical methods**

*PCB or firearm*—Use of a PCB or firearm (free bullet) may be appropriate for some species as a first step or adjunct method of euthanasia, when there is species-specific knowledge of target sites and safety considerations can be met.

Advantages of these methods are that they are moderately rapid (considering application of any needed restraint), they may be relatively easily implemented under various conditions, they are applicable across a wide range of species and sizes, and they leave no environmental residues (other than lead, which may be sequestered). There are some disadvantages in that they require appropriate, well-maintained equipment and well-trained personnel, they are potentially aesthetically displeasing for observers, and they present safety risks for personnel associated with the keeping and use of firearms. Refer to ballistics details in the section on Physical Methods and experts for more information on selection and use of firearms.

### **S7.4.5 ADJUNCTIVE METHODS**

*Potassium chloride*—Potassium chloride can be administered IV or intracardially to stop the heart of animals that are deeply anesthetized or unconscious. Potassium chloride does not create artifacts that can interfere with histopathologic examination and, therefore, its application may be appropriate when accurate postmortem diagnostic or research results

are important. Potassium chloride may also be used adjunctively for large animals that are first anesthetized with barbiturates, particularly where volume of administration is a limitation. In many cases significant agonal reflex activity can be avoided where barbiturates are administered prior to administration of potassium chloride.

*Exsanguination*—Exsanguination may be useful as a secondary or tertiary method to ensure death. The aesthetics of this procedure and its acceptance by personnel must be considered in its application.

*Cervical dislocation or decapitation*—Applied to small mammals and birds, this method may be useful as an adjunct or as a first-step method of euthanasia. A paucity of data for wildlife and the potential for interspecies variation creates challenges for establishing specific size recommendations. However, based on domestic animals, manual cervical dislocation may be appropriate for birds < 3 kg (6.6 lb), rodents < 200 g (0.44 lb), and rabbits < 1 kg (2.2 lb).<sup>365</sup> A secondary method such as decapitation or exsanguination should be employed to ensure death when feasible.

*Thoracic compression*—Thoracic compression may be useful in rare circumstances in animals that are deeply anesthetized or otherwise unconscious, or as a final, confirmatory step when the animal's status is uncertain.

#### **S7.4.6 UNACCEPTABLE METHODS**

Methods that are classified as being unacceptable for use in comparable domestic species are unacceptable for use in wild mammals that are not deeply anesthetized.

#### **S7.4.7 EMBRYOS, FETUSES, AND NEONATES**

Euthanasia of embryos, fetuses, and neonates should be conducted using guidelines appropriate for taxonomically similar domestic mammals.

### **S7.5 CAPTIVE MARINE MAMMALS**

Due to their unique anatomic and physiologic adaptations for aquatic environments, the large size of some species, and the challenges associated with performing euthanasia under typical circumstances, marine mammals are considered separately from other mammals. To facilitate making appropriate recommendations regarding euthanasia, marine mammals have been divided into physiologically and anatomically distinct groups. These groups follow taxonomic lines to some extent, though it is appropriate to consider the sea otter (a large mustelid) with small pinnipeds: 1) pinnipeds, 2) odontocetes, 3) mysticetes, and 4) sirenids. Methods addressed under S7.4 Captive Nonmarine Mammals are applicable to polar bears and therefore will not be addressed in this section. Sizes of the animals vary dramatically among and within these groups and each group should minimally be divided into subgroups by size (large and small). Recommendations for euthanasia of marine

mammals in managed care facilities differ from those used for free-ranging marine mammals, because of differences in environment and facilities, restraint capabilities, and personnel and observers.

### **S7.5.1 ACCEPTABLE METHODS**

#### **S7.5.1.1 Noninhaled agents**

Intravenous administration of barbiturates and their derivatives can be a rapid and reliable method of euthanasia for small pinnipeds, small odontocetes, and sirenids. Intraperitoneal administration is also acceptable where intravascular administration is not possible or is outweighed by distress from the requirement of additional restraint, pain from alternate methods, risk to personnel, or other similar reasons, although tissue irritation and variable absorption rates must be considered. Safe and effective IV administration of these agents may also be possible in anesthetized, moribund, or unconscious large pinnipeds and in large odontocetes. For the largest odontocetes, drug dilution in large volumes may limit the effectiveness of euthanasia agents administered IV. Intracardiac administration is acceptable only in anesthetized, moribund, or unconscious animals.

The advantage of using barbiturates is that death is usually rapid. Unfortunately, voluntary peripheral vasoconstriction by cetaceans or hypovolemic shock may limit access to peripheral veins. There is also a risk of injury for personnel attempting venipuncture if animals are not restrained. Furthermore tissue residues can present challenges for disposal of the animal's remains and personnel are responsible for ensuring that secondary toxicity does not occur.

Intramuscular administration of sedatives or anesthetics may be required to immobilize large, anxious, or fractious animals to ensure animal and personnel safety prior to administration of IV euthanasia agents. Agents that have successfully been used alone or in combination for this purpose include tiletamine-zolazepam, ketamine, xylazine, meperidine, fentanyl, midazolam, diazepam, acepromazine, and etorphine.<sup>381</sup> Veterinarians should be aware that administration of anesthetics or sedatives in fat layers can result in prolonged time to effect and diminished depth of sedation and anesthesia. In addition, tissue residues, particularly when ultrapotent opioids are administered, need to be considered when disposing of the animal's remains.<sup>382</sup>

### **S7.5.2 ACCEPTABLE WITH CONDITIONS METHODS**

#### **S7.5.2.1 Inhaled agents**

Inhaled anesthetics (eg, halothane, isoflurane, sevoflurane, methoxyflurane, enflurane) are uncommonly used to euthanize marine mammals because these animals' ability to breath-hold means that extended periods of physical restraint are necessary for their administration. Extended restraint generally poses unacceptable risks and stress for the animal and for personnel unless the animal is substantially

debilitated, sedated, or anesthetized. Use of inhaled agents may be appropriate for small pinnipeds after administration of an injectable sedative or anesthetic under circumstances where acceptable methods are not practical or appropriate for other reasons.

Inhaled agents present some advantages in that they do not require phlebotomy skills and may present minimal concern for tissue residues.<sup>383</sup> Disadvantages include that they are expensive, require an extended delivery time with associated risks of distress and injury for animals and personnel, and may be noxious to the animal.

#### S7.5.2.2 Physical methods

Physical methods, although used to euthanize free-ranging marine mammals, will generally not be used on captive mammals due to limited efficacy for these species, risk for personnel, and aesthetics.

## S7.6 FREE-RANGING WILDLIFE

### S7.6.1 GENERAL CONSIDERATIONS

Free-ranging wildlife are present in all habitats across North America including fresh and salt water. Wildlife includes representatives of all known animal taxa, but for the purpose of the Guidelines, will be restricted to amphibians, reptiles, birds, and mammals, including some feral and exotic species. Wildlife are enjoyed and used by people in a number of ways including nonconsumptive uses (wildlife viewing, bird watching, bird feeding) and legal harvest (hunting, fishing, commercial take). Varied interests and perspectives can influence what methods are used to terminate the lives of free-ranging wildlife.<sup>384</sup> This section of the Guidelines updates and expands upon previous editions by recognizing an inherent lack of control over free-ranging wildlife, accepting that firearms may be the most appropriate approach to their euthanasia, and acknowledging that the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia (ie, distinguishes between euthanasia and methods that are more accurately characterized as humane killing).

Because of the variety of situations that may be encountered, it is difficult to strictly classify methods for termination of free-ranging wildlife as acceptable, acceptable with conditions, or unacceptable. Furthermore, classification of a given method as a means of euthanasia or humane killing may vary by circumstances. These acknowledgments are not intended to condone a lower standard for the humane termination of wildlife. The best methods possible under the circumstances must be applied, and new technology and methods demonstrated to be superior to previously used methods must be embraced.

Multiple federal, state, and local regulations apply to the euthanasia of wildlife. In the United States, management of wildlife is primarily under state jurisdiction. However, some species (eg, migratory birds, endangered species, marine mammals) are protected and managed by federal agencies or through collabo-

ration between state and federal agencies. Within the context of wildlife management, personnel associated with state and federal agencies and Native American tribes may handle or capture individual animals or groups of animals for various purposes, including research. During the course of these management actions, individual animals may become injured or debilitated and may require euthanasia; in other cases, research or collection protocols dictate that some of them be killed. Sometimes population management requires the lethal control of wildlife species. And, the public may identify and/or present individual animals to state or federal personnel because they are orphaned, sick, injured, diseased (eg, rabid), or becoming a nuisance. Another aspect of wildlife management is rehabilitation of orphaned or injured wildlife. For the most part, wildlife rehabilitation is done by private citizens and requirements for handling these animals vary by state and species.

### S7.6.2 SPECIAL CONSIDERATIONS

The primary factor influencing methods selected for euthanasia of free-ranging wildlife is lack of control over the animal. In addition, some species may be too large to effectively euthanize by conventional means. Marine mammals are of particular concern due to their large size and the lack of standardized equipment and techniques (see Free-Ranging Marine Mammals for more information). Other species, such as reptiles, may be refractory to conventional euthanasia agents. The potential for secondary toxicity and environmental hazards associated with the remains of animals euthanized by chemical means are of substantial concern, as is disposal of large or numerous animal remains. Therefore, while some methods described in the taxonomically based sections for non-domestic animals may be useful for euthanizing free-ranging wildlife, their applicability will vary.

Given that close human contact is stressful and difficult to achieve for most free-ranging animals, these animals may have to be euthanized or immobilized from a distance. In some cases (eg, suburban areas), discharge of a firearm is illegal, is considered a serious threat to human safety, or may be inappropriate for other reasons. Consequently, free-ranging animals may need to be killed quickly and efficiently in ways that may not fulfill the criteria for euthanasia established by the POE.

Remotely delivered chemical immobilization may be required when wildlife cannot be captured. If a free-ranging animal is within an acceptable range, trained individuals may use species and situation-specific anesthetic agents and remote injection equipment to anesthetize that animal to allow handling. Once anesthetized, many wildlife species can be euthanized via methods similar to those applied to domestic or captive wild animals of similar species and size. Other techniques used in wildlife management for trapping or capturing animals may also be applied to allow some degree of control over the animal.

Care must be taken to prevent secondary intoxication of animals or people during disposal of the remains of free-ranging wildlife that contain residues of euthanasia agents. This is a legal requirement that often requires deep burial, incineration, or rendering. In other situations, however, natural decomposition may be desirable. Use of gunshot can minimize concerns for secondary toxicity, with the exception of lead ballistics. Alternatives to lead ballistics are recommended where possible.

Although not typically a part of wildlife management programs, disease outbreaks or overpopulation may require culling or large-scale killing of animals. In addition to selecting the most appropriate methods for minimizing spread of infectious agent, protecting animal welfare, and protecting the environment, such situations must consider the concerns and perceptions of the general public, as well as impacts upon personnel who are directly involved in culling, killing, or euthanasia. Detailed information about depopulation methods is beyond the scope of this document, but is available in the AVMA Guidelines for the Depopulation of Animals.<sup>288</sup>

Research objectives may limit the use of some euthanasia agents or methods for wildlife species. Nevertheless, termination of life still dictates that the most humane, rather than the most convenient, methods be used to meet the study's objectives.

Within the context of wildlife rehabilitation, euthanasia of individual animals must be considered if a fully functional animal cannot be returned to the wild, if the release of such animals would pose a threat to the health of the free-ranging wildlife population, or if no alternatives for care or housing exist. While there are a limited number of nonreleasable animals that can be used for educational or display purposes, most animals that are determined to be unfit for release should be euthanized as soon as possible. Because most animals in rehabilitation facilities are confined, adequate control through physical or chemical restraint can usually be achieved that will allow administration of euthanasia agents as described in the taxonomically based sections for non-domestic animals.

### **S7.6.3 METHODS**

Little published information is available regarding appropriate methods for euthanasia of specific species of free-ranging wildlife. Schwartz et al<sup>385</sup> evaluated immobilization and euthanasia for white-tailed deer, Hyman<sup>386</sup> and Needham<sup>387</sup> described euthanasia methods for captive or stranded marine mammals, and the euthanasia of waterfowl was described by Gullett<sup>388</sup> and Franson.<sup>252</sup> Methods for euthanasia of wildlife in rehabilitation facilities have also been described.<sup>283</sup>

While multiple publications describe euthanasia methods for domestic and nondomestic animals,<sup>95,251,271,336,337</sup> as well as for wildlife under free-ranging conditions,<sup>389-392</sup> their recommendations are

inconsistent. Many conventional euthanasia techniques and methods can be applied to free-ranging wildlife, if the animals are sufficiently under the control of personnel. However, because of the variety of conditions under which euthanasia of free-ranging wildlife may need to be conducted, choice of the most humane method will vary by species, situation, and individual animal. Conditions specified for use of various methods in previous sections will generally apply to free-ranging wildlife, but may be modified according to circumstances to minimize animal distress and pain, as well as emotional impact and physical risks to personnel.

#### **S7.6.3.1 Acceptable methods**

##### **S7.6.3.1.1 Noninhaled agents**

Chemical methods of euthanasia applicable to free-ranging wildlife include overdoses of injectable anesthetic agents (including barbiturates), T-61, or other agents that are listed as acceptable for domestic animals or captive wildlife. Premedication with an injectable or inhaled agent may reduce animal distress and/or human safety risks, under some circumstances.

#### **S7.6.3.2 Acceptable with conditions methods**

##### **S7.6.3.2.1 Inhaled agents**

*Inhaled anesthetics*—Inhaled anesthetics are acceptable with conditions for euthanasia of avian and mammalian wildlife species when these methods are more practical than acceptable methods, and where the limitations of this method are understood and addressed. Smaller species that can be confined in enclosed containers can be euthanized using open-drop methods of administration.<sup>393</sup> Larger species may be restrained for face-mask administration, when animal distress associated with restraint can be minimized. Portable equipment is available that can make these methods practical. Preference should be given to the use of alternate methods for taxa that can breath-hold for extended periods of time.

*Carbon dioxide, carbon monoxide, and other inert gases*—These agents, which are classified as being acceptable with conditions for domestic animals, are also acceptable with conditions for euthanasia of free-ranging wildlife. Conditions that must be met for using these agents are similar to those for domestic animals.

##### **S7.6.3.2.2 Physical methods**

Gunshot is acceptable with conditions for euthanasia of free-ranging, captured, or confined wildlife, provided that bullet placement is to the head (targeted to destroy the brain).<sup>337</sup> Gunshot targeted to the heart (chest) or to the neck (vertebrae, with the intent of severing the spinal cord) presents challenges for accurate placement, but may be the best option for free-ranging or other settings where close approach is not possible or where the head must be preserved for disease testing (rabies, chronic wasting, or other suspected neurologic diseases). Based on domestic animal models (see section of the Guidelines addressing Farmed Animals Used for Food and



Fiber), gunshot to the chest or neck may not result in rapid death and may be considered humane killing, rather than euthanasia. In some environments (eg, urban and suburban areas), discharge of a firearm may present a serious threat to human safety and may be inappropriate. Refer to ballistics details in the Physical Methods section and experts for more information on selection and use of firearms.

#### S7.6.3.3 Adjunctive methods

*Potassium chloride*—Potassium chloride may be administered IV or intracardially to stop the heart of animals that are deeply anesthetized or unconscious. Administration of potassium chloride can also be preferred for large animals when administered with barbiturates, where volume of administration is a limitation.

*Exsanguination*—Bleeding may be used as an adjunctive method to ensure the death of animals that are anesthetized or otherwise unconscious. The aesthetics of this procedure and its acceptance by personnel and observers should be considered.

*Cervical dislocation or decapitation*—Applied to small mammals and birds, this method may be useful as an adjunct or as a first-step method of euthanasia. A paucity of data for wildlife and the potential for interspecies variation create challenges for establishing specific size recommendations. However, on the basis of data for domestic animals, manual cervical dislocation without the use of tools may be appropriate for birds < 3 kg, rodents < 200 g, and rabbits < 1 kg.<sup>365</sup> A secondary method such as decapitation or exsanguination should be employed to ensure death when feasible.

*Thoracic compression*—Thoracic compression may be useful in rare circumstances in animals that are deeply anesthetized or otherwise unconscious, or as a final, confirmatory method to ensure death when the animal's status is uncertain.<sup>273</sup>

#### S7.6.3.4 Unacceptable methods

Approaches to euthanasia that ignore recent advances in technology, and that do not minimize risks to animal welfare, personnel safety, and the environment for a particular set of circumstances, are unacceptable.

### S7.6.4 EMBRYOS, FETUSES, AND NEONATES

Methods that are acceptable for euthanasia of domestic or captive wildlife species in developmental or neonatal stages are generally acceptable for euthanasia of similar stages of free-ranging wildlife.

## S7.7 FREE-RANGING MARINE MAMMALS

Selecting a method of euthanasia for free-ranging marine mammals can be a substantial challenge because of large body size, environmental constraints, and concerns for the safety of personnel. It can also be difficult to determine when stranded marine mammals are unconscious or dead.<sup>394</sup> Currently available euthanasia methods generally have significant limita-

tions that fail to meet aesthetic or other conventional standards for euthanasia of marine mammals under field conditions, particularly for large animals. Nevertheless, the options available must be evaluated to identify the best option under a given set of circumstances. Further research is warranted to identify improved methods of euthanasia.

### S7.7.1 ACCEPTABLE METHODS

#### S7.7.1.1 Noninhaled agents

*Injectable agents*—Overdoses of injectable anesthetics can be used to euthanize marine mammals under field conditions. Anesthetics that can be used alone or in combination include tiletamine-zolazepam, ketamine, xylazine, meperidine, fentanyl, midazolam, diazepam, butorphanol, acepromazine, barbiturates, and etorphine.<sup>381,382,395,396</sup> Intramuscular administration of anesthetics may be required to achieve restraint of conscious animals before personnel can safely perform euthanasia using injectable agents by an intravascular route. A clear understanding of species anatomy and use of sufficiently long needles are required to ensure that muscle, rather than fat, is the site of injection.

Injectable anesthetics may be administered by multiple routes. Mucocutaneous administration, via the blowhole, can be an effective method that maximizes personnel safety.<sup>396</sup> Intravenous administration can be rapid and reliable for small pinnipeds, small odontocetes, and sirinids. For larger animals, safe IV administration is generally limited to animals that are anesthetized or unconscious. In addition, drug dilution in large blood volumes of large odontocetes and mysticetes may limit the effectiveness of IV administered agents. Intraperitoneal administration can be effective for small marine mammals if sufficiently long needles are available to access the peritoneal cavity. However, delayed absorption may limit the efficacy of drugs administered via this route. Intracardiac administration is acceptable only in anesthetized, moribund, or unconscious animals. This approach requires special, strong, and long needles to ensure that the heart can be accessed.

Advantages of injectable anesthetics are that they act rapidly and personnel experienced with these methods are readily available. Their administration is logistically simple and aesthetically acceptable in small to medium-sized animals, and public safety is relatively easy to secure. However, voluntary peripheral vasoconstriction by cetaceans or hypovolemic shock may limit access to peripheral veins and fat layers must be bypassed for effective administration. Large quantities of drug may be required to effectively euthanize large animals, and administration of single types of agents, such as  $\alpha_2$ -adrenergic receptor agonists, can result in animals passing through aesthetically displeasing and potentially unsafe excitation phases of anesthesia. There is a risk of injury for personnel attempting to access veins if animals are not appropriately restrained, and personnel may also

face self-administration risks (especially for ultrapotent opioids). Environmental contamination and scavenger exposure are possible due to residues in the animal's remains.

### S7.7.2 ACCEPTABLE WITH CONDITIONS METHODS

#### S7.7.2.1 Physical methods

**Gunshot**—Gunshot is acceptable with conditions for euthanizing small marine mammals when injectable methods are not practical; conventional projectile ballistics are not recommended for use in large odontocetes or large mysticetes. References are available to assist in identifying appropriate anatomic landmarks and caliber of ballistics.<sup>397-403</sup>

Advantages of gunshot include a rapid death and equipment that is generally readily available. Gunshot also poses minimal risk for other animals that may scavenge the animal's remains. However, its efficacy is highly dependent on the knowledge, technical expertise, and experience of the operator. Associated noise can distress other animals (especially in the case of mass strandings) and ricochet poses a risk to bystanders. Euthanasia by gunshot may also be aesthetically displeasing and emotionally distressing for personnel and bystanders. Compliance with firearm regulations is also required. Refer to details for ballistics in the Physical Methods section and experts for more information on selection and use of firearms.

**Manually applied blunt force trauma**—In situations where other options are not available, a concussive blow to the head may be an effective method of euthanasia for small juvenile marine mammals.<sup>404</sup> The advantages of properly applied manual blunt force trauma are that it results in rapid death, no special equipment is required, and there is limited potential for secondary toxicity for scavengers. However, the efficacy of manually applied blunt force trauma is highly dependent on knowledge and experience of the operator and it is aesthetically displeasing for personnel and observers.

**Implosive decerebration**—Decerebration of large mysticetes and odontocetes can be effectively accomplished through the detonation of properly placed, shaped, and dimensioned explosive charges.<sup>405,406</sup> Advantages of this technique include a rapid death, limited potential for exposure of scavengers to toxic residues, and protection of personnel from injury by tail flukes. Its efficacy, however, is highly dependent on the knowledge, skills, and experience of the operator; it is aesthetically displeasing; and personnel and bystanders must be sufficiently distant from the resulting explosion to avoid injury. If these conditions can be met, implosive decerebration is an acceptable method of euthanasia.

### S7.7.3 ADJUNCTIVE METHODS

**Potassium chloride or succinylcholine**—While unacceptable as sole agents of euthanasia in awake animals, potassium chloride or succinylcholine may

be used to ensure the death of animals that are anesthetized or unconscious. Saturated potassium chloride solutions can be mixed inexpensively in large volumes and can be administered IV or intracardially, with a low risk of secondary toxicity for scavengers when preferred methods of disposal of the remains (eg, deep burial, rendering) are not available.<sup>381,382,407</sup>

### S7.7.4 UNACCEPTABLE METHODS

**Inhaled agents**—While acceptable with conditions from an animal welfare standpoint, practical and human and environmental safety constraints generally prevent use of inhaled agents for euthanasia of marine mammals under field conditions.

**Exsanguination**—Exsanguination is inappropriate as a sole method of euthanasia because it requires an excessively long time to death, is believed to produce anxiety associated with extreme hypovolemia, and is aesthetically displeasing to bystanders. It can, however, be used as an adjunctive method to ensure the death of unconscious animals.<sup>402</sup>

## S8 Footnotes

- a. Mays J. Euthanasia certification (slide presentation). Natl Anim Control Assoc Euthanasia Certification Workshop, Dayton, Ohio, September 2011.
- b. Walsh JL. *Evaluation of methods for on-farm euthanasia of commercial meat rabbits*. MS thesis, Department of Pathobiology, University of Guelph, Guelph, ON, Canada, 2016.
- c. Channon HA, Walker PJ, Kerr MG, et al. Using a gas mixture of nitrous oxide and carbon dioxide during stunning provides only small improvements to pig welfare (abstr), in *Proceedings*. 10th Bienn Conf Australas Pig Sci Assoc 2005;13.
- d. Telazol, Fort Dodge Animal Health, Overland Park, Kan.

## S9 References

1. Hart LA, Hart BL, Mader B. Humane euthanasia and companion animal death: caring for the animal, the client, and the veterinarian. *J Am Vet Med Assoc* 1990;197:1292-1299.
2. Nogueira Borden LJ, Adams CL, Bonnett BN, et al. Use of the measure of patient-centered communication to analyze euthanasia discussions in companion animal practice. *J Am Vet Med Assoc* 2010;237:1275-1287.
3. Lagoni L, Butler C. Facilitating companion animal death. *Compend Contin Educ Pract Vet* 1994;16:70-76.
4. Martin F, Ruby KL, Deking TM, et al. Factors associated with client, staff, and student satisfaction regarding small animal euthanasia procedures at a veterinary teaching hospital. *J Am Vet Med Assoc* 2004;224:1774-1779.
5. Reeve CL, Rogelberg SG, Spitzmuller C, et al. The caring-killling paradox: euthanasia-related strain among animal shelter workers. *J Appl Soc Psychol* 2005;35:119-143.
6. Rogelberg SG, Reeve CL, Spitzmüller C, et al. Impact of euthanasia rates, euthanasia practices, and human resource practices on employee turnover in animal shelters. *J Am Vet Med Assoc* 2007;230:713-719.
7. Rhoades RH. The euthanasia area. In: *The Humane Society of the United States euthanasia training manual*. Washington, DC: The Humane Society of the United States, 2002;21-30.
8. Carpenter JW. *Exotic animal formulary*. 3rd ed. St Louis: WB Saunders Co, 2005.
9. Wadham JJB, Townsend P, Morton DB. Intraperitoneal injection of sodium pentobarbitone as a method of euthanasia for rodents. *ANZCCART News* 1997;10:8.
10. Svendsen O, Kok L, Lauritzen B. Nociception after intra-

- peritoneal injection of a sodium pentobarbitone formulation with and without lidocaine in rats quantified by expression of neuronal c-fos in the spinal cord—a preliminary study. *Lab Anim* 2007;41:197-203.
11. Ambrose N, Wadham J, Morton D. Refinement of euthanasia. In: Balls M, Zeller A-M, Halder ME, eds. *Progress in the reduction, refinement and replacement of animal experimentation*. Amsterdam: Elsevier, 2000;1159-1170.
  12. Grier RL, Schaffer CB. Evaluation of intraperitoneal and intrahepatic administration of a euthanasia agent in animal shelter cats. *J Am Vet Med Assoc* 1990;197:1611-1615.
  13. Hellebrekers LJ, Baumans V, Bertens APMG, et al. On the use of T61 for euthanasia of domestic and laboratory animals; an ethical evaluation. *Lab Anim* 1990;24:200-204.
  14. Fakkema D. *Operational guide for animal care and control agencies: euthanasia by injection*. Denver: American Humane Association, 2010.
  15. Rhoades RH. Selecting the injection site. In: *The Humane Society of the United States euthanasia training manual*. Washington, DC: The Humane Society of the United States, 2002;41-50.
  16. Cooney KA. *In-home pet euthanasia techniques: the veterinarian's guide to helping pets and their families say goodbye in the comfort of home*. Loveland, Colo: Home to Heaven PC, 2011.
  17. Longair JA, Finley GG, Laniel MA, et al. Guidelines for the euthanasia of domestic animals by firearms. *Can Vet J* 1991;32:724-726.
  18. Hanyok PM. Guidelines for police officers when responding to emergency animal incidents. *Anim Welf Inf Center Bull* winter 2001-spring 2002;11(3-4). Available at: [www.nal.usda.gov/awic/newsletters/v11n3/11n3hany.htm](http://www.nal.usda.gov/awic/newsletters/v11n3/11n3hany.htm). Accessed Sep 12, 2011.
  19. Dennis MB, Jr., Dong WK, Weisbrod KA, et al. Use of captive bolt as a method of euthanasia in larger laboratory animal species. *Lab Anim Sci* 1988;38:459-462.
  20. Ramsay EC, Wetzel RW. Comparison of five regimens for oral administration of medication to induce sedation in dogs prior to euthanasia. *J Am Vet Med Assoc* 1998;213:240-242.
  21. Wetzel RW, Ramsay EC. Comparison of four regimens for intraoral administration of medication to induce sedation in cats prior to euthanasia. *J Am Vet Med Assoc* 1998;213:243-245.
  22. Rhoades RH. Pre-euthanasia anesthetic. In: *The Humane Society of the United States euthanasia training manual*. Washington, DC: The Humane Society of the United States, 2002;67-80.
  23. Mellor DJ. Galloping colts, fetal feelings, and reassuring regulations: putting animal welfare science into practice. *J Vet Med Educ* 2010;37:94-100.
  24. Leist KH, Grauwiler J. Fetal pathology in rats following uterine-vessel clamping on day 14 of gestation. *Teratology* 1974;10:55-67.
  25. Rhoades RH. Understanding euthanasia. In: *The Humane Society of the United States euthanasia training manual*. Washington, DC: The Humane Society of the United States, 2002;1-10.
  26. Rhoades RH. Physical restraint. In: *The Humane Society of the United States euthanasia training manual*. Washington, DC: The Humane Society of the United States, 2002;51-66.
  27. Arnold M, Langhans W. Effects of anesthesia and blood sampling techniques on plasma metabolites and corticosterone in the rat. *Physiol Behav* 2010;99:592-598.
  28. Grieves JL, Dick EJ, Schlalbritz-Loutsevich NE, et al. Barbiturate euthanasia solution-induced tissue artifact in nonhuman primates. *J Med Primatol* 2008;37:154-161.
  29. Traslavina RP, King EJ, Loar AS, et al. Euthanasia by CO<sub>2</sub> inhalation affects potassium levels in mice. *J Am Assoc Lab Anim Sci* 2010;49:316-322.
  30. Faupel RP, Seitz HJ, Tarnowski W, et al. The problem of tissue sampling from experimental animals with respect to freezing technique, anoxia, stress and narcosis. A new method for sampling rat liver tissue and the physiological values of glycolytic intermediates and related compounds. *Arch Biochem Biophys* 1972;148:509-522.
  31. Boivin GP, Bottomley MA, Schiml PA, et al. Physiologic, behavioral, and histologic responses to various euthanasia methods in C57BL/6NTac male mice. *J Am Assoc Lab Anim Sci* 2017;56:69-78.
  32. Boivin GP, Hickman DL, Creamer-Hente MA, et al. Review of CO<sub>2</sub> as a euthanasia agent for laboratory rats and mice. *J Am Assoc Lab Anim Sci* 2017;56:491-499.
  33. Castelhana-Carlos MJ, Baumans V. The impact of light, noise, cage cleaning and in-house transport on welfare and stress of laboratory rats. *Lab Anim* 2009;43:311-327.
  34. Crawley J. Aggression. In: *What's wrong with my mouse?* 2nd ed. New York: Wiley & Sons, 2007;213-217.
  35. Balcombe JP, Barnard ND, Sandusky C, et al. Laboratory routines cause animal stress. *Contemp Top Lab Anim Sci* 2004;43:42-51.
  36. Sharp J, Zammit T, Azar T, et al. Are "by-stander" female Sprague-Dawley rats affected by experimental procedures? *Contemp Top Lab Anim Sci* 2003;42:19-27.
  37. Sharp J, Zammit T, Azar T, et al. Stress-like responses to common procedures in individually and group-housed female rats. *Contemp Top Lab Anim Sci* 2003;42:9-18.
  38. Sharp J, Zammit T, Azar T, et al. Does witnessing experimental procedures produce stress in male rats? *Contemp Top Lab Anim Sci* 2002;41(5):8-12.
  39. Sharp JL, Zammit TG, Azar T, et al. Stress-like responses to common procedures in male rats housed alone or with other rats. *Contemp Top Lab Anim Sci* 2002;41(4):8-14.
  40. Daev EV, Vorob'ev KV, Zimina SA. Olfactory stress and modification of phagocytosis in peripheral blood cells of adult male mice [in Russian]. *Tsitologiya* 2001;43:954-960.
  41. Moynihan JA, Karp JD, Cohen N, et al. Immune deviation following stress odor exposure: role of endogenous opioids. *J Neuroimmunol* 2000;102:145-153.
  42. Baines MG, Haddad EK, Pomerantz DK, et al. Effects of sensory stimuli on the incidence of fetal resorption in a murine model of spontaneous abortion: the presence of an alien male and postimplantation embryo survival. *J Reprod Fertil* 1994;102:221-228.
  43. Moynihan JA, Karp JD, Cohen N, et al. Alterations in interleukin-4 and antibody production following pheromone exposure: role of glucocorticoids. *J Neuroimmunol* 1994;54:51-58.
  44. Stevens DA, Gerzog-Thomas DA. Fright reactions in rats to conspecific tissue. *Physiol Behav* 1977;18:47-51.
  45. Stevens DA, Saplikoski NJ. Rats' reactions to conspecific muscle and blood—evidence for an alarm substance. *Behav Biol* 1973;8:75-82.
  46. Garnett N. PHS policy on humane care and use of laboratory animals clarification regarding use of carbon dioxide for euthanasia of small laboratory animals. Release date: July 17, 2002. Available at: [grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html). Accessed Dec 14, 2010.
  47. Khoo SY, Lay BPP, Joya J, et al. Local anaesthetic refinement of pentobarbital euthanasia reduces abdominal writhing without affecting immunohistochemical endpoints in rats. *Lab Anim* 2018;52:152-162.
  48. Dutton JW, Artwohl JE, Huang X, et al. Assessment of pain associated with the injection of sodium pentobarbital in laboratory mice (*Mus musculus*). *J Am Assoc Lab Anim Sci* 2019;58:373-379.
  49. Vaupel DB, McCoun D, Cone EJ. Phencyclidine analogs and precursors: rotarod and lethal dose studies in the mouse. *J Pharmacol Exp Ther* 1984;230:20-27.
  50. Constantinides C, Mean R, Janssen BJ. Effects of isoflurane anesthesia on the cardiovascular function of the C57BL/6 mouse. *ILAR J* 2011;52:e21-e31.
  51. Brunson DB. Pharmacology of inhalation anesthetics. In: Kohn DF, Wixson SK, White WJ, et al, eds. *Anesthesia and analgesia in laboratory animals*. San Diego: Academic Press, 1997;32-33.

52. Makowska IJ, Weary DM. Rat aversion to induction with inhaled anaesthetics. *Appl Anim Behav Sci* 2009;119:229-235.
53. Gaertner DJ, Hallman TM, Hankenson FC, et al. Anesthesia and analgesia for laboratory rodents. In: Fish RE, Brown MJ, Danneman PJ, et al, eds. *Anesthesia and analgesia in laboratory animals*. New York: Elsevier, 2008:278.
54. Marquardt N, Feja M, Hunigen H, et al. Euthanasia of laboratory mice: are isoflurane and sevoflurane real alternatives to carbon dioxide? *PLoS One* 2018;13:e0203793.
55. Seymour TL, Nagamine CM. Evaluation of isoflurane overdose for euthanasia of neonatal mice. *J Am Assoc Lab Anim Sci* 2016;55:321-323.
56. Valentim AM, Guedes SR, Pereira AM, et al. Euthanasia using gaseous agents in laboratory rodents. *Lab Anim* 2016;50:241-253.
57. Hickman DL, Johnson SW. Evaluation of the aesthetics of physical methods of euthanasia of anesthetized rats. *J Am Assoc Lab Anim Sci* 2011;50:695-701.
58. Valentine H, Williams WO, Maurer KJ. Sedation or inhalant anesthesia before euthanasia with CO<sub>2</sub> does not reduce behavioral or physiologic signs of pain and stress in mice. *J Am Assoc Lab Anim Sci* 2012;51:50-57.
59. Hornett TD, Haynes AP. Comparison of carbon dioxide/air mixture and nitrogen/air mixture for the euthanasia of rodents: design of a system for inhalation euthanasia. *Anim Technol* 1984;35:93-99.
60. Hewett TA, Kovacs MS, Artwohl JE, et al. A comparison of euthanasia methods in rats, using carbon dioxide in pre-filled and fixed flow-rate filled chambers. *Lab Anim Sci* 1993;43:579-582.
61. Powell K, Ethun K, Taylor DK. The effect of light level, CO<sub>2</sub> flow rate, and anesthesia on the stress response of mice during CO<sub>2</sub> euthanasia. *Lab Anim (NY)* 2016;45:386-395.
62. Boivin GP, Bottomley MA, Dudley ES, et al. Physiological, behavioral, and histological responses of male C57BL/6N mice to different CO<sub>2</sub> chamber replacement rates. *J Am Assoc Lab Anim Sci* 2016;55:451-461.
63. Hickman DL, Fitz SD, Bernabe CS, et al. Evaluation of low versus high volume per minute displacement CO<sub>2</sub> methods of euthanasia in the induction and duration of panic-associated behavior and physiology. *Animals (Basel)* 2016;6:45.
64. Chisholm JM, Pang DS. Assessment of carbon dioxide, carbon dioxide/oxygen, isoflurane and pentobarbital killing methods in adult female Sprague-Dawley rats. *PLoS One* 2016;11:e0162639.
65. Danneman PJ, Stein S, Walshaw SO. Humane and practical implications of using carbon dioxide mixed with oxygen for anesthesia or euthanasia of rats. *Lab Anim Sci* 1997;47:376-385.
66. Weary DM, Makowska IJ. Rat aversion to carbon monoxide. *Appl Anim Behav Sci* 2009;121:148-151.
67. Ramsay DS, Watson CH, Leroux BG, et al. Conditioned place aversion and self-administration of nitrous oxide in rats. *Pharmacol Biochem Behav* 2003;74:623-633.
68. Duke T, Caulkett NA, Tataryn JM. The effect of nitrous oxide on halothane, isoflurane and sevoflurane requirements in ventilated dogs undergoing ovariohysterectomy. *Vet Anaesth Analg* 2006;33:343-350.
69. Thomas AA, Flecknell PA, Golledge HD. Combining nitrous oxide with carbon dioxide decreases the time to loss of consciousness during euthanasia in mice—refinement of animal welfare? *PLoS One* 2012;7:e32290.
70. Meyer RE, Fish R. Pharmacology of injectable anesthetics, sedatives, and tranquilizers. In: Fish RE, Danneman PJ, Brown M, et al, eds. *Anesthesia and analgesia of laboratory animals*. 2nd ed. San Diego: Academic Press, 2008:27-82.
71. Wixson SK, Smiler KL. Anesthesia and analgesia in rodents. In: Kohn SJ, Wixson SK, White WJ, et al, eds. *Anesthesia and analgesia in laboratory animals*. San Diego: Academic Press Inc, 1997:165-200.
72. Lord R. Use of ethanol for euthanasia of mice. *Aust Vet J* 1989;66:268.
73. Lord R. Humane killing. *Nature* 1991;350:456.
74. Allen-Worthington KH, Brice AK, Marx JO, et al. Intraperitoneal injection of ethanol for the euthanasia of laboratory mice (*Mus musculus*) and rats (*Rattus norvegicus*). *J Am Assoc Lab Anim Sci* 2015;54:769-778.
75. de Souza Dyer C, Brice AK, Marx JO. Intraperitoneal administration of ethanol as a means of euthanasia for neonatal mice (*Mus musculus*). *J Am Assoc Lab Anim Sci* 2017;56:299-306.
76. Cartner SC, Barlow SC, Ness TJ. Loss of cortical function in mice after decapitation, cervical dislocation, potassium chloride injection, and CO<sub>2</sub> inhalation. *Comp Med* 2007;57:570-573.
77. Vanderwolf CH, Buzak DP, Cain RK, et al. Neocortical and hippocampal electrical activity following decapitation in the rat. *Brain Res* 1988;451:340-344.
78. Mikeska JA, Klemm WR. EEG evaluation of humaneness of asphyxia and decapitation euthanasia of the laboratory rat. *Lab Anim Sci* 1975;25:175-179.
79. Fagin KD, Shinsako J, Dallman MF. Effects of housing and chronic cannulation on plasma ACTH and corticosterone in the rat. *Am J Physiol* 1983;245:E515-E520.
80. Boivin GP, Bottomley MA, Grobe N. Responses of male C57BL/6N mice to observing the euthanasia of other mice. *J Am Assoc Lab Anim Sci* 2016;55:406-411.
81. Burkholder TH, Niel L, Weed JL, et al. Comparison of carbon dioxide and argon euthanasia: effects on behavior, heart rate, and respiratory lesions in rats. *J Am Assoc Lab Anim Sci* 2010;49:448-453.
82. Sharp J, Azar T, Lawson D. Comparison of carbon dioxide, argon, and nitrogen for inducing unconsciousness or euthanasia of rats. *J Am Assoc Lab Anim Sci* 2006;45:21-25.
83. Gent TC, Detotto C, Vysotski AL, et al. Epileptiform activity during inert gas euthanasia of mice. *PLoS One* 2018;13:e0195872.
84. Detotto C, Isler S, Wehrle M, et al. Nitrogen gas produces less behavioural and neurophysiological excitation than carbon dioxide in mice undergoing euthanasia. *PLoS One* 2019;14:e0210818.
85. Fitzgerald M. The development of nociceptive circuits. *Nat Rev Neurosci* 2005;6:507.
86. Biran V, Verney C, Ferriero DM. Perinatal cerebellar injury in human and animal models. *Neurol Res Int* 2012;2012:858929.
87. Silverman J, Hendricks G. Sensory neuron development in mouse coccygeal vertebrae and its relationship to tail biopsies for genotyping. *PLoS One* 2014;9:e88158.
88. Cunningham MG, McKay RD. A hypothermic miniaturized stereotaxic instrument for surgery in newborn rats. *J Neurosci Methods* 1993;47:105-114.
89. Danneman PJ, Mandrell TD. Evaluation of five agents/methods for anesthesia of neonatal rats. *Lab Anim Sci* 1997;47:386-395.
90. Phifer CB, Terry LM. Use of hypothermia for general anesthesia in preweanling rodents. *Physiol Behav* 1986;38:887-890.
91. Mellor DJ, Diesch TJ, Gunn AJ, et al. The importance of 'awareness' for understanding fetal pain. *Brain Res Brain Res Rev* 2005;49:455-471.
92. Muñoz-Mediavilla C, Cámara JA, Salazar S, et al. Evaluation of the foetal time to death in mice after application of direct and indirect euthanasia methods. *Lab Anim* 2016;50:100-107.
93. Pritchett K, Corrow D, Stockwell J, et al. Euthanasia of neonatal mice with carbon dioxide. *Comp Med* 2005;55:275-281.
94. Pritchett-Corning KR. Euthanasia of neonatal rats with carbon dioxide. *J Am Assoc Lab Anim Sci* 2009;48:23-27.
95. Close B, Banister K, Baumans V, et al. Recommendations for euthanasia of experimental animals: part 2. DGXT of the European Commission. *Lab Anim* 1997;31:1-32.
96. Diesch TJ, Mellor DJ, Johnson CB, et al. Electroencephalographic responses to tail clamping in anaesthetised rat pups. *Lab Anim* 2009;43:224-231.
97. Mellor DJ, Diesch TJ, Johnson CB. When do mammalian young become sentient? *ALTEX* 2010;27(suppl 1):281-286.

98. Vogler G. Anesthesia and analgesia. In: Suckow MA, Weisbroth SH, Franklin CL, eds. *The laboratory rat*. 2nd ed. San Diego: Academic Press, 2006;658.
99. Flecknell PA, Roughan JV, Hedenqvist P. Induction of anaesthesia with sevoflurane and isoflurane in the rabbit. *Lab Anim* 1999;33:41-46.
100. Flecknell PA. *Laboratory animal anaesthesia*. 2nd ed. San Diego: Elsevier Academic Press, 1996;168-171.
101. Hedenqvist P, Roughan JV, Antunes L, et al. Induction of anaesthesia with desflurane and isoflurane in the rabbit. *Lab Anim* 2001;35:172-179.
102. Hayward JS, Lissou PA. Carbon dioxide tolerance of rabbits and its relation to burrow fumigation. *Aust Wildl Res* 1978;5:253-261.
103. Hayward JS. Abnormal concentrations of respiratory gases in rabbit burrows. *J Mammal* 1966;47:723-724.
104. Dalmau A, Palliser A, Pedernera C, et al. Use of high concentrations of carbon dioxide for stunning rabbits reared for meat production. *World Rabbit Sci* 2016;24:25-37.
105. Walsh JL, Percival A, Turner PV. Efficacy of blunt force trauma, a novel mechanical cervical dislocation device, and a non-penetrating captive bolt device for on-farm euthanasia of pre-weaned kits, growers, and adult commercial meat rabbits. *Animals (Basel)* 2017;7:100.
106. Schütt-Abraham I, Knauer-Kraetzl B, Wormuth HJ. Observations during captive bolt stunning of rabbits. *Berl Munch Tierarztl Wochenschr* 1992;105:10-15.
107. Walsh J, Percival A, Tapscott B, et al. On-farm euthanasia practices and attitudes of commercial meat rabbit producers. *Vet Rec* 2017;181:292.
108. Wilson JM, Bunte RM, Carty AJ. Evaluation of rapid cooling and tricaine methanesulfonate (MS222) as methods of euthanasia in zebrafish (*Danio rerio*). *J Am Assoc Lab Anim Sci* 2009;48:785-789.
109. Collymore C, Banks KE, Turner PV. Lidocaine hydrochloride compared with MS222 for the euthanasia of zebrafish (*Danio rerio*). *J Am Assoc Lab Anim Sci* 2016;55:816-820.
110. Blessing JJ, Marshal JC, Balcombe SR. Humane killing of fishes for scientific research: a comparison of two methods. *J Fish Biol* 2010;76:2571-2577.
111. Varga ZM, Matthews M, Trevarrow B, et al. *Hypothermic shock is a reliable and rapid euthanasia method for zebrafish*. Final report to OLAW on euthanasia of zebrafish. Bethesda, Md: Office of Laboratory Animal Welfare, National Institutes of Health, 2008.
112. Köhler A, Collymore C, Finger-Baier K, et al. Report of Workshop on Euthanasia for Zebrafish—a matter of welfare and science. *Zebrafish* 2017;14:547-551.
113. Strykowski JL, Schech JM. Effectiveness of recommended euthanasia methods in larval zebrafish (*Danio rerio*). *J Am Assoc Lab Anim Sci* 2015;54:81-84.
114. Wallace CK, Bright LA, Marx JO, et al. Effectiveness of rapid cooling as a method of euthanasia for young zebrafish (*Danio rerio*). *J Am Assoc Lab Anim Sci* 2018;57:58-63.
115. National Institutes of Health. *Guidelines for use of zebrafish in the NIH intramural research program*. Bethesda, Md: National Institutes of Health, 2009. Available at: [oacu.od.nih.gov/arac/documents/Zebrafish.pdf](http://oacu.od.nih.gov/arac/documents/Zebrafish.pdf). Accessed Nov 25, 2010.
116. Torreilles SL, McClure DE, Green SL. Evaluation and refinement of euthanasia methods for *Xenopus laevis*. *J Am Assoc Lab Anim Sci* 2009;48:512-516.
117. Grandin T. Objective scoring of animal handling and stunning practices at slaughter plants. *J Am Vet Med Assoc* 1998;212:36-39.
118. Grandin T. Effect of animal welfare audits of slaughter plants by a major fast food company on cattle handling and stunning practices. *J Am Vet Med Assoc* 2000;216:848-851.
119. Grandin T. Euthanasia and slaughter of livestock. *J Am Vet Med Assoc* 1994;204:1354-1360.
120. Grandin T. Pig behavior studies applied to slaughter-plant design. *Appl Anim Ethol* 1982;9:141-151.
121. Grandin T. Observations of cattle behavior applied to design of cattle handling facilities. *Appl Anim Ethol* 1980;6:19-31.
122. Thurmon JC. Euthanasia of food animals. *Vet Clin North Am Food Anim Pract* 1986;2:743-756.
123. Fulwider WK, Grandin T, Rollin BE, et al. Survey of management practices on one hundred and thirteen north central and northeastern United States dairies. *J Dairy Sci* 2008;91:1686-1692.
124. Humane Slaughter Association. *Humane killing of livestock using firearms: guidance notes #3*. 2nd ed. Wheathampstead, England: Humane Slaughter Association, 2005.
125. Woods J, Shearer JK, Hill J. Recommended on-farm euthanasia practices. In: Grandin T, ed. *Improving animal welfare: a practical approach*. Wallingford, England: CABI Publishing, 2010.
126. Baker HJ, Scrimgeour HJ. Evaluation of methods for the euthanasia of cattle in a foreign animal disease outbreak. *Can Vet J* 1995;36:160-165.
127. Finnie IW. Traumatic head injury in ruminant livestock. *Aust Vet J* 1997;75:204-208.
128. Finnie JW, Manavis J, Summersides GE, et al. Brain damage in pigs produced by impact with a non-penetrating captive bolt pistol. *Aust Vet J* 2003;81:153-155.
129. Grandin T. Return-to-sensibility problems after penetrating captive bolt stunning of cattle in commercial beef slaughter plants. *J Am Vet Med Assoc* 2002;221:1258-1261.
130. Blackmore DK. Energy requirements for the penetration of heads of domestic stock and the development of a multiple projectile. *Vet Rec* 1985;116:36-40.
131. Daly CC, Whittington PE. Investigation into the principal determinants of effective captive bolt stunning of sheep. *Res Vet Sci* 1989;46:406-408.
132. Daly CC. Recent developments in captive bolt stunning. In: *Humane slaughter of animals for food*. Potters Bar, England: Universities Federation for Animal Welfare, 1986;15-20.
133. Gregory N, Shaw F. Penetrating captive bolt stunning and exsanguination of cattle in abattoirs. *J Appl Anim Welf Sci* 2000;3:215-230.
134. Grandin T. Maintenance of good animal welfare standards in beef slaughter plants by use of auditing programs. *J Am Vet Med Assoc* 2005;226:370-373.
135. Gibson TJ, Rebelo CB, Gowers TA, et al. Electroencephalographic assessment of concussive non-penetrative captive bolt stunning of turkeys. *Br Poult Sci* 2018;59:13-20.
136. World Organisation for Animal Health (OIE). Chapter 7.6: killing of animals for disease control purposes. In: *Terrestrial animal health code*. 20th ed. Paris: OIE, 2011. Available at: [www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_1.7.6.htm](http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.6.htm). Accessed May 16, 2011.
137. National Farm Animal Care Council. Code of Practice for the Care and Handling of Bison. 2017. Available at: [www.nfacc.ca/codes-of-practice/bison](http://www.nfacc.ca/codes-of-practice/bison). Accessed Nov 11, 2019.
138. Schwenk BK, Lechner I, Ross SG, et al. Magnetic resonance imaging and computer tomography of brain lesions in water buffaloes and cattle stunned with handguns or captive bolts. *Meat Sci* 2016;113:35-40.
139. Gregory NG, Spence JY, Mason CW, et al. Effectiveness of poll stunning water buffalo with captive bolt guns. *Meat Sci* 2009;81:178-182.
140. Gregory NG, Wotton SB. Time to loss of brain responsiveness following exsanguination in calves. *Res Vet Sci* 1984;37:141-143.
141. Schulze W, Schultze-Petzold H, Hazem AS, et al. Experiments on the objective assessment of pain and consciousness in slaughtering sheep and calves by the conventional method (humane killer stunning) and by ritual slaughtering laws (shechita). *Dtsch Tierarztl Wochenschr* 1978;85:62-66.
142. Blackmore DK. Differences in behavior between sheep and cattle during slaughter. *Res Vet Sci* 1984;37:223-226.
143. Bager F, Devine CE, Gilbert KV. Jugular blood flow in calves after head-only electrical stunning and throat-cutting. *Meat Sci* 1988;22:237-243.
144. Daly CC, Kallweit E, Ellendorf F. Cortical function in cattle during slaughter: conventional captive bolt stunning fol-

- lowed by exsanguination compared with shechita slaughter. *Vet Rec* 1988;122:325-329.
145. Newhook JC, Blackmore DK. Electroencephalographic studies of stunning and slaughter of sheep and calves: part 1—the onset of permanent insensibility in sheep during slaughter. *Meat Sci* 1982;6:221-233.
  146. Gregory NG, Fielding HR, von Wenzlawowicz M, et al. Time to collapse following slaughter without stunning in cattle. *Meat Sci* 2010;85:66-69.
  147. Rosen SD. Physiological insights into shechita. *Vet Rec* 2004;154:759-765.
  148. Gregory NG. Physiology of stress, distress, stunning and slaughter. In: *Animal welfare and meat science*. Wallingford, England: CABI Publishing, 1998;64-92.
  149. Gibson TJ, Johnson CB, Murrell JC, et al. Components of electroencephalographic responses to slaughter in halothane-anesthetized calves: effects of cutting neck tissues compared with major blood vessels. *N Z Vet J* 2009;57:84-89.
  150. Mellor DJ, Gibson TJ, Johnson CB. A re-evaluation of the need to stun calves prior to slaughter by ventral-neck incision: an introductory review. *N Z Vet J* 2009;57:74-76.
  151. Leach TM, Wilkins LJ. Observations on the physiological effects of pithing cattle at slaughter. *Meat Sci* 1985;15:101-106.
  152. Daly CC, Whittington PE. Concussive methods of pre-slaughter stunning in sheep: effects of captive bolt stunning in the poll position on brain function. *Res Vet Sci* 1986;41:353-355.
  153. Withrock IC. The use of carbon dioxide (CO<sub>2</sub>) as an alternative euthanasia method for goat kids. Available at: search.proquest.com/docview/1733971790/abstract/C0605E819B-D543A6PQ/1. Accessed Nov 11, 2019.
  154. Gibson TJ, Whitehead C, Taylor R, et al. Pathophysiology of penetrating captive bolt stunning in Alpacas (*Vicugna pacos*). *Meat Sci* 2015;100:227-231.
  155. Plummer PJ, Shearer JK, Kleinhenz KE, et al. Determination of anatomic landmarks for optimal placement in captive-bolt euthanasia of goats. *Am J Vet Res* 2018;79:276-281.
  156. AVMA. AVMA guidelines for the humane slaughter of animals: 2016 edition. Available at: www.avma.org/KB/Resources/Reference/AnimalWelfare/Documents/Humane-Slaughter-Guidelines.pdf.
  157. Collins SL, Caldwell M, Hecht S, et al. Comparison of penetrating and nonpenetrating captive bolt methods in horned goats. *Am J Vet Res* 2017;78:151-157.
  158. Evers AS, Crowder CM, Balsler JR. General anesthetics. In: Brunton LL, Lazo JS, Parker KL, eds. *Goodman and Gilman's the pharmacological basis of therapeutics*. 11th ed. New York: McGraw-Hill Medical Publishing Division, 2006;362.
  159. Limon G, Guitian J, Gregory NG. A note on the slaughter of llamas in Bolivia by the puntilla method. *Meat Sci* 2009;82:405-406.
  160. Limon G, Guitian J, Gregory NG. An evaluation of the humaneness of puntilla in cattle. *Meat Sci* 2010;84:352-355.
  161. Finnie JW, Blumbergs PC, Manavis J, et al. Evaluation of brain damage resulting from penetrating and non-penetrating captive bolt stunning using lambs. *Aust Vet J* 2000;78:775-778.
  162. Finnie JW, Manavis J, Blumberg PC, et al. Brain damage in sheep from penetrating captive bolt stunning. *Aust Vet J* 2002;80:67-69.
  163. Grist A, Lines JA, Knowles TG, et al. The use of a mechanical non-penetrating captive bolt device for the euthanasia of neonate lambs. *Animals (Basel)* 2018;8:49.
  164. Sutherland MA, Watson TJ, Johnson CB, et al. Evaluation of the efficacy of a non-penetrating captive bolt to euthanase neonatal goats up to 48 hours of age. *Anim Welf* 2016;25:471-479.
  165. Grist A, Lines JA, Knowles TG, et al. Use of a non-penetrating captive bolt for euthanasia of neonate goats. *Animals (Basel)* 2018;8:58.
  166. Chapter OIE. 7.5.5: management of fetuses during slaughter of pregnant animals. In: *Terrestrial animal health code*. 17th ed. Paris: OIE, 2008;284.
  167. Jochems CE, van der Valk JB, Stafleu FR, et al. The use of fetal bovine serum: ethical or scientific problem? *Altern Lab Anim* 2002;30:219-227.
  168. Yan EB, Barburamani AA, Walker AM, et al. Changes in cerebral blood flow, cerebral metabolites, and breathing movements in the sheep fetus following asphyxia produced by occlusion of the umbilical cord. *Am J Physiol Regul Integr Comp Physiol* 2009;297:R60-R69.
  169. Mellor DJ. Integration of perinatal events, pathophysiological changes and consequences for the newborn lamb. *Br Vet J* 1988;144:552-569.
  170. Peisker N, Preissel AK, Rechenbach HD, et al. Foetal stress responses to euthanasia of pregnant sheep. *Berl Munch Tierarztl Wochenschr* 2010;123:2-10.
  171. Klauenberg BA, O'Malley J, Clark T, et al. Euthanasia of mouse fetuses and neonates. *Contemp Top Lab Anim Sci* 2004;43:29-34.
  172. Küchenmeister U, Kuhn G, Ender K. Preslaughter handling of pigs and the effect on heart rate, meat quality, including tenderness, and sarcoplasmic reticulum Ca<sup>2+</sup> transport. *Meat Sci* 2005;71:690-695.
  173. Küchenmeister U, Kuhn G, Stabenow B, et al. The effect of experimental stress on sarcoplasmic reticulum Ca<sup>2+</sup> transport and meat quality in pig muscle. *Meat Sci* 2002;61:375-380.
  174. Geverink NA, Schouten WGP, Gort G, et al. Individual differences in behavioral and physiological responses to restraint stress in pigs. *Physiol Behav* 2002;77:451-457.
  175. Magnusson U, Wattrang E, Tsuma V, et al. Effects of stress resulting from short-term restraint on in vitro functional capacity of leukocytes obtained from pigs. *Am J Vet Res* 1998;59:421-425.
  176. Neubert E, Gurtler H, Vallentin G. Effect of restraining growth pigs with snare restraints on plasma levels of catecholamines, cortisol, insulin and metabolic parameters. *Berl Munch Tierarztl Wochenschr* 1996;109:409-413.
  177. Roozen AW, Magnusson U. Effects of short-term restraint stress on leukocyte counts, lymphocyte proliferation and lysis of erythrocytes in gilts. *Zentralbl Veterinarmed B* 1996;43:505-511.
  178. Roozen AWM, Tsuma VT, Magnusson U. Effects of short-term restraint stress on plasma concentrations of catecholamines,  $\beta$ -endorphin, and cortisol in gilts. *Am J Vet Res* 1995;56:1225-1227.
  179. Farmer C, Dubreuil P, Couture Y, et al. Hormonal changes following an acute stress in control and somatostatin-immunized pigs. *Domest Anim Endocrinol* 1991;8:527-536.
  180. Muir W. *Handbook of veterinary anesthesia*. 3rd ed. St Louis: Mosby, 2000.
  181. Maisch A, Ritzmann M, Heinritz K. The humane euthanasia of pigs with pentobarbital. *Tierarztl Umsch* 2005;60:679-683.
  182. National Pork Board, American Association of Swine Practitioners. *On-farm euthanasia of swine*. 2nd edition. Des Moines, Iowa: National Pork Board, 2009.
  183. Althen TG, Ono K, Topel DG. Effect of stress susceptibility or stunning method on catecholamine levels in swine. *J Anim Sci* 1977;44:985-989.
  184. Humane Slaughter Association. *Captive bolt stunning of livestock: guidance notes No. 2*. 4th ed. Wheathampstead, England: Humane Slaughter Association, 2006.
  185. Van der Wal PP. Stunning, sticking and exsanguination as stress factors in pigs, in *Proceedings*. 2nd Int Symp Cond Meat Qual Pigs 1971;153-158.
  186. Anil MH, McKinstry JL. Reflexes and loss of sensibility following head-to-back electrical stunning in sheep. *Vet Rec* 1991;128:106-107.
  187. Blackmore DK, Newhook JC. Insensibility during slaughter of pigs in comparison to other domestic stock. *N Z Vet J* 1981;29:219-222.
  188. McKinstry JL, Anil MH. The effect of repeat application of electrical stunning on the welfare of pigs. *Meat Sci* 2004;67:121-128.
  189. Humane Slaughter Association. *Electrical stunning of red*

- meat animals: guidance notes No. 4. Wheathampstead, England: Humane Slaughter Association, 2000;1-22.
190. Anil MH, McKinstry JL. Variations in electrical stunning tong placements and relative consequences in slaughter pigs. *Vet J* 1998;155:85-90.
  191. Anil MH, McKinstry JL. The effectiveness of high frequency electrical stunning in pigs. *Meat Sci* 1992;31:481-491.
  192. Lambooij B, Merkus GSM, VonVoorst N, et al. Effect of a low voltage with a high frequency electrical stunning on unconsciousness in slaughter pigs. *Fleischwirtschaft (Frankf)* 1996;76:1327-1328.
  193. Lambooij E. Stunning of animals on the farm. *Tijdschr Diergeneeskde* 1994;119:264-266.
  194. Troeger K, Woltersdorf W. Electrical stunning and meat quality in the pig. *Fleischwirtschaft (Frankf)* 1990;70:901-904.
  195. Wotton SB, Gregory NG. Pig slaughtering procedures: time to loss of brain responsiveness after exsanguination of cardiac arrest. *Res Vet Sci* 1986;40:148-151.
  196. Hoenderken R. Electrical stunning of pigs. In: Fabiansson S, ed. *Hearing on pre-slaughter stunning (report No. 52)*. Kävlinge, Sweden: Swedish Meat Research Centre, 1978;29-38.
  197. Denicourt M, Klopfenstein C, Dufour C, et al. Using an electrical approach to euthanize pigs on-farm: fundamental principles to know, in *Proceedings. 41st Annu Meet Am Assoc Swine Vet* 2010;451-468.
  198. Raj ABM, Gregory NG. Welfare implications of the gas stunning of pigs: 1. Determination of aversion to the initial inhalation of carbon dioxide or argon. *Anim Welf* 1995;4:273-280.
  199. Raj AB. Behaviour of pigs exposed to mixtures of gases and the time required to stun and kill them: welfare implications. *Vet Rec* 1999;144:165-168.
  200. Raj AB, Johnson SP, Wotton SB, et al. Welfare implications of gas stunning pigs: 3. the time to loss of somatosensory evoked potentials and spontaneous electrocorticogram of pigs during exposure to gases. *Vet J* 1997;153:329-339.
  201. Raj ABM, Gregory NG. Welfare implications of the gas stunning of pigs: 2. Stress of induction of anaesthesia. *Anim Welf* 1996;5:71-78.
  202. Troeger K, Woltersdorf W. Gas anaesthesia of slaughter pigs. 1. Stunning experiments under laboratory conditions with fat pigs of known halothane reaction type—meat quality, animal protection. *Fleischwirtschaft (Frankf)* 1991;72:1063-1068.
  203. Martoft L, Lomholt L, Kolthoff C, et al. Effects of CO<sub>2</sub> anaesthesia on central nervous system activity in swine. *Lab Anim* 2002;36:115-126.
  204. Forslid A. Transient neocortical, hippocampal, and amygdaloid EEG silence induced by one minute inhalation of high CO<sub>2</sub> concentration in swine. *Acta Physiol Scand* 1987;130:1-10.
  205. Jongman EC, Barnett JL, Hemsworth PH. The aversiveness of carbon dioxide stunning in pigs and a comparison of the CO<sub>2</sub> stunner crate vs the V-restrainter. *Appl Anim Behav Sci* 2000;67:67-76.
  206. Velarde A, Cruz J, Gispert M, et al. Aversion to carbon dioxide stunning in pigs: effect of carbon dioxide concentration and halothane genotype. *Anim Welf* 2007;16:513-522.
  207. Nowak B, Mueffling TV, Caspari K, et al. Validation of a method for the detection of virulent *Yersinia enterocolitica* and their distribution in slaughter pigs from conventional and alternative housing systems. *Vet Microbiol* 2006;117:219-228.
  208. Channon HA, Payne AM, Warner RD. Halothane genotype, pre-slaughter handling and stunning method all influence pork quality. *Meat Sci* 2000;56:291-299.
  209. Forslid A. Muscle spasms during pre-slaughter CO<sub>2</sub> anaesthesia in pigs. Ethical considerations. *Fleischwirtschaft (Frankf)* 1992;72:167-168.
  210. Forslid A, Augustinsson O. Acidosis, hypoxia and stress hormone release in response to one-minute inhalation of 80% CO<sub>2</sub> in swine. *Acta Physiol Scand* 1988;132:223-231.
  211. Gregory NG, Moss BW, Leeson RH. An assessment of carbon dioxide stunning in pigs. *Vet Rec* 1987;121:517-518.
  212. Overstreet JW, Marple DN, Huffman DL, et al. Effect of stunning methods on porcine muscle glycolysis. *J Anim Sci* 1975;41:1014-1020.
  213. Meyer RE, Morrow WEM. Carbon dioxide for emergency on-farm euthanasia of swine. *J Swine Health Prod* 2005;13:210-217.
  214. Sadler LJ, Karriker LA, Schwartz KJ, et al. Are severely depressed suckling pigs resistant to gas euthanasia? *Anim Welf* 2014;23:145-155.
  215. Widowski T. *Effectiveness of a non-penetrating captive bolt for on-farm euthanasia of low viability piglets*. Des Moines, Iowa: National Pork Board, 2008.
  216. Whiting TL, Steele GG, Wamnes S, et al. Evaluation of methods of rapid mass killing of segregated early weaned piglets. *Can Vet J* 2011;52:753-758.
  217. Grist A, Lines JA, Knowles T, et al. The use of a non-penetrating captive bolt for the euthanasia of neonate piglets. *Animals (Basel)* 2018;8:48.
  218. Casey-Trott TM, Millman ST, Turner PV, et al. Effectiveness of a nonpenetrating captive bolt for euthanasia of 3 kg to 9 kg pigs. *J Anim Sci* 2014;92:5166-5174.
  219. Webster AB, Fletcher DL, Savage SI. Humane on-farm killing of spent hens. *J Appl Poult Res* 1996;5:191-200.
  220. United Egg Producers. Animal husbandry guidelines for US egg-laying flocks. 2010 edition. Alhambra, Ga: United Egg Producers, 2010. Available at: [www.unitedegg.org/information/pdf/UEP\\_2010\\_Animal\\_Welfare\\_Guidelines.pdf](http://www.unitedegg.org/information/pdf/UEP_2010_Animal_Welfare_Guidelines.pdf). Accessed Aug 13, 2012.
  221. Jaksch W. Euthanasia of day-old male chicks in the poultry industry. *Int J Study Anim Probl* 1981;2:203-213.
  222. Gurung S, White D, Archer G, et al. Evaluation of alternative euthanasia methods of neonatal chickens. *Animals (Basel)* 2018;8:37.
  223. Blackshaw JK, Fenwick DC, Beattie AW, et al. The behavior of chickens, mice and rats during euthanasia with chloroform, carbon dioxide and ether. *Lab Anim* 1988;22:67-75.
  224. Latimer KS, Rakich PM. Necropsy examination. In: Ritchie BW, Harrison GJ, Harrison LR, eds. *Avian medicine: principles and application*. Lake Worth, Fla: Wingers Publishing Inc, 1994;355-379.
  225. Webster AB, Fletcher DL. Reactions of laying hens and broilers to different gases used for stunning poultry. *Poult Sci* 2001;80:1371-1377.
  226. Lambooij E, Gerritzen MA, Engel B, et al. Behavioural responses during exposure of broiler chickens to different gas mixtures. *Appl Anim Behav Sci* 1999;62:255-265.
  227. Gerritzen MA, Lambooij E, Stegeman JA, et al. Slaughter of poultry during the epidemic of avian influenza in the Netherlands in 2003. *Vet Rec* 2006;159:39-42.
  228. Mohan Raj AB, Wotton SB, Gregory NG. Changes in the somatosensory evoked potentials and spontaneous electroencephalogram of hens during stunning with a carbon dioxide and argon mixture. *Br Vet J* 1992;148:147-156.
  229. Webster AB, Collett SR. A mobile modified-atmosphere killing system for small-flock depopulation. *J Appl Poult Res* 2012;21:131-144.
  230. Raj ABM, Whittington PE. Euthanasia of day-old chicks with carbon dioxide and argon. *Vet Rec* 1995;136:292-294.
  231. Poole GH, Fletcher DL. A comparison of argon, carbon dioxide, and nitrogen in a broiler killing system. *Poult Sci* 1995;74:1218-1223.
  232. McKeegan DEF, McIntyre JA, Demmers TGM, et al. Physiological and behavioural responses of broilers to controlled atmosphere stunning: implications for welfare. *Anim Welf* 2007;16:409-426.
  233. Coenen AML, Lankhaar J, Lowe JC, et al. Remote monitoring of electroencephalogram, electrocardiogram, and behavior during controlled atmosphere stunning in broilers: implications for welfare. *Poult Sci* 2009;88:10-19.
  234. McKeegan DEF, Sandercock DA, Gerritzen MA. Physiological responses to low atmospheric pressure stunning and the implications for welfare. *Poult Sci* 2013;92:858-868.
  235. Erasmus MA, Lawlis P, Duncan IJ, et al. Using time to insensi-

- bility and estimated time of death to evaluate a nonpenetrating captive bolt, cervical dislocation, and blunt trauma for on-farm killing of turkeys. *Poult Sci* 2010;89:1345-1354.
236. Erasmus MA, Turner PV, Niekamp SG, et al. Brain and skull lesions resulting from use of percussive bolt, cervical dislocation by stretching, cervical dislocation by crushing and blunt trauma in turkeys. *Vet Rec* 2010;167:850-858.
  237. Erasmus MA, Turner PV, Widowski TM. Measures of insensibility used to determine effective stunning and killing of poultry. *J Appl Poult Res* 2010;19:288-298.
  238. Gregory NG, Wotton SB. Comparison of neck dislocation and percussion of the head on visual evoked responses in the chicken's brain. *Vet Rec* 1990;126:570-572.
  239. Martin JE, Sandercock DA, Sandilands V, et al. Welfare risk of repeated application of on-farm killing methods for poultry. *Animals (Basel)* 2018;8:E39.
  240. Bader S, Meyer-Kühling B, Güntheret R, et al. Anatomical and histologic pathology induced by cervical dislocation following blunt head trauma for on-farm euthanasia of poultry. *J Appl Poult Res* 2014;23:546-556.
  241. Cors JC, Gruber AD, Günther R, et al. Electroencephalographic evaluation of the effectiveness of blunt trauma to induce loss of consciousness for on-farm killing of chickens and turkeys. *Poult Sci* 2015;94:147-155.
  242. Martin JE, McKeegan DEG, Sparrey J, et al. Comparison of novel mechanical cervical dislocation and a modified captive bolt for on-farm killing of poultry on behavioural reflex responses and anatomical pathology. *Anim Welf* 2016;25:227-241.
  243. Woolcott CR, Torrey S, Turner PV, et al. Evaluation of two models of non-penetrating captive bolt devices for on-farm euthanasia of turkeys. *Animals (Basel)* 2018;8:E42.
  244. Orosz S. Birds. In: *Guidelines for euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;46-49.
  245. American Association of Avian Pathologists (AAAP) Animal Welfare and Management Practices Committee. *Review of mechanical euthanasia of day-old poultry*. Athens, Ga: American Association of Avian Pathologists, 2005.
  246. Federation of Animal Science Societies (FASS). *Guide for the care and use of agricultural animals in agricultural research and teaching*. Champaign, Ill: Federation of Animal Science Societies, 2010.
  247. Agriculture Canada. *Recommended code of practice for the care and handling of poultry from hatchery to processing plant*. Publication 1757/E.1989. Ottawa: Agriculture Canada, 1989.
  248. European Council. *European Council Directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing. Annex G: killing of surplus chicks and embryos in hatchery waste*. Brussels: European Council, 1993.
  249. Shearer JK, Nicoletti P. Anatomical landmarks. Available at: [www.vetmed.iastate.edu/vdpam/extension/dairy/programs/humane-euthanasia/anatomical-landmarks](http://www.vetmed.iastate.edu/vdpam/extension/dairy/programs/humane-euthanasia/anatomical-landmarks). Accessed Jun 24, 2011.
  250. Aleman M, Davis E, Williams DC, et al. Electrophysiologic study of a method of euthanasia using intrathecal lidocaine hydrochloride administered during intravenous anesthesia in horses. *J Vet Intern Med* 2015;29:1676-1682.
  251. AVMA. AVMA guidelines on euthanasia. June 2007. Available at: [www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf). Accessed May 7, 2011.
  252. Franson JC. Euthanasia. In: Friend M, Franson JC, eds. *Field manual of wildlife diseases. General field procedures and diseases of birds*. Biological Resources Division information and technology report 1999-001. Washington, DC: US Department of the Interior and US Geological Survey, 1999;49-53.
  253. Mason C, Spence J, Bilbe L, et al. Methods for dispatching backyard poultry. *Vet Rec* 2009;164:220.
  254. Rae M. Necropsy. In: *Clinical avian medicine*. Vol 2. Palm Beach, Fla: Spix Publishing Inc, 2006;661-678.
  255. Hess L. Euthanasia techniques in birds—roundtable discussion. *J Avian Med Surg* 2005;19:242-245.
  256. Gaunt AS, Oring LW. *Guidelines to the use of wild birds in research*. Washington, DC: The Ornithological Council, 1997.
  257. Dawson MD, Johnson KJ, Benson ER, et al. Determining cessation of brain activity during depopulation or euthanasia of broilers using accelerometers. *J Appl Poult Res* 2009;18:135-142.
  258. Raj M, O'Callaghan M, Thompson K, et al. Large scale killing of poultry species on farm during outbreaks of diseases: evaluation and development of a humane containerised gas killing system. *Worlds Poult Sci J* 2008;64:227-244.
  259. Raj M. Humane killing of nonhuman animals for disease control purposes. *J Appl Anim Welf Sci* 2008;11:112-124.
  260. Powell FL. Respiration. In: Whittow GC, ed. *Sturkie's avian physiology*. 5th ed. San Diego: Academic Press, 2000;233-264.
  261. King AS, McLelland J. Respiratory system. In: King AS, McLelland J, eds. *Birds: their structure and function*. 2nd ed. Eastbourne, England: Bailliere Tindall, 1984;110-144.
  262. Dumonceaux G, Harrison GJ. Toxins. In: Ritchie BW, Harrison GJ, Harrison LR, eds. *Avian medicine: principles and application*. Lake Worth, Fla: Wingers Publishing, 1994;1030-1052.
  263. Scott KE, Bracchi LA, Lieberman MT, et al. Evaluation of best practices for the euthanasia of zebra finches (*Taeniopygia guttata*). *J Am Assoc Lab Anim Sci* 2017;56:802-806.
  264. Gerritzen M, Lambooi B, Reimert H, et al. A note on behaviour of poultry exposed to increasing carbon dioxide concentrations. *Appl Anim Behav Sci* 2007;108:179-185.
  265. Benson E, Malone GW, Alphin RL, et al. Foam-based mass emergency depopulation of floor-reared meat-type poultry operations. *Poult Sci* 2007;86:219-224.
  266. Raj ABM. Aversive reactions to argon, carbon dioxide and a mixture of carbon dioxide and argon. *Vet Rec* 1996;138:592-593.
  267. Raj ABM. Recent developments in stunning and slaughter of poultry. *Worlds Poult Sci J* 2006;62:462-484.
  268. McKeegan DEF, McIntyre J, Demmers TGM, et al. Behavioural responses of broiler chickens during acute exposure to gaseous stimulation. *Appl Anim Behav Sci* 2006;99:271-286.
  269. Raj ABM, Gregory NG, Wotton SB. Changes in the somatosensory evoked potentials and spontaneous electroencephalogram of hens during stunning in argon-induced anoxia. *Br Vet J* 1991;147:322-330.
  270. Close B, Banister K, Baumans V, et al. Recommendations for euthanasia of experimental animals: part 1. DGXI of the European Commission. *Lab Anim* 1996;30:293-316.
  271. Gregory NG, Wotton SB. Effect of slaughter on the spontaneous and evoked activity of the brain. *Br Poult Sci* 1986;27:195-205.
  272. Borski RJ, Hodson RG. Fish research and the institutional animal care and use committee. *ILAR J* 2003;44:286-294.
  273. Paul-Murphy JR, Engilis A Jr, Pascoe PJ, et al. Comparison of intrasosseous pentobarbital administration and thoracic compression for euthanasia of anesthetized sparrows (*Passer domesticus*) and starlings (*Sturnus vulgaris*). *Am J Vet Res* 2017;78:887-899.
  274. Clifford DH. Preanesthesia, anesthesia, analgesia, and euthanasia. In: Fox JG, Cohen BJ, Loew FM, eds. *Laboratory animal medicine*. New York: Academic Press Inc, 1984;528-563.
  275. Dyakonova VE. Role of opioid peptides in behavior of invertebrates. *J Evol Biochem Physiol* 2001;37:335-347.
  276. Rose JD. The neurobehavioral nature of fishes and the question of awareness and pain. *Rev Fish Sci* 2002;10:1-38.
  277. Nordgreen J, Horsberg TE, Ranheim B, et al. Somatosensory evoked potentials in the telencephalon of Atlantic salmon (*Salmo salar*) following galvanic stimulation of the tail. *J Comp Physiol A Neuroethol Sens Neural Behav Physiol* 2007;193:1235-1242.



278. Dunlop R, Laming P. Mechanoreceptive and nociceptive responses in the central nervous system of goldfish (*Carassius auratus*) and trout (*Oncorhynchus mykiss*). *J Pain* 2005;6:561-568.
279. Elwood RW, Appel M. Pain experience in hermit crabs? *Anim Behav* 2009;77:1243-1246.
280. Barr S, Laming PR, Dick JTA, et al. Nociception or pain in a decapod crustacean? *Anim Behav* 2008;75:745-751.
281. Ashley PJ, Sneddon LU, McCrohan CR. Nociception in fish: stimulus response properties of receptors on the head of trout *Oncorhynchus mykiss*. *Brain Res* 2007;1166:47-54.
282. Braithwaite VA, Boulcott P. Pain perception, aversion and fear in fish. *Dis Aquat Organ* 2007;75:131-138.
283. Alvarez FA, Rodriguez-Martin I, Gonzalez-Nuñez V, et al. New kappa opioid receptor from zebrafish *Danio rerio*. *Neurosci Lett* 2006;405:94-99.
284. Sneddon LU. Trigeminal somatosensory innervation of the head of a teleost fish with particular reference to nociception. *Brain Res* 2003;972:44-52.
285. Buatti MC, Pasternak GW. Multiple opiate receptors: phylogenetic differences. *Brain Res* 1981;218:400-405.
286. Finger TE. Fish that taste with their feet: spinal sensory pathways in the sea robin, *Prionotus carolinus*. *Biol Bull* 1981;161:154-161.
287. Schulman JA, Finger TE, Brecha NC, et al. Enkephalin immunoreactivity in Golgi cells and mossy fibres of mammalian, avian and teleost cerebellum. *Neuroscience* 1981;6:2407-2416.
288. AVMA. AVMA guidelines for the depopulation of animals: 2019 edition. Available at: [www.avma.org/KB/Policies/documents/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf](http://www.avma.org/KB/Policies/documents/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf). Accessed Nov 11, 2019.
289. Jepson J. A linguistic analysis of discourse on the killing of nonhuman animals. *Soc Anim* 2008;16:127-148.
290. Yanong RPE, Hartman KH, Watson CA, et al. *Fish slaughter, killing, and euthanasia: a review of major published US guidance documents and general considerations of methods*. Publication #CIR1525. Gainesville, Fla: Fisheries and Aquatic Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, 2007. Available at: [edis.ifas.ufl.edu/fa150](http://edis.ifas.ufl.edu/fa150). Accessed May 16, 2011.
291. Hartman KH. Fish. In: *Guidelines for euthanasia of non-domestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006:28-38.
292. Håstein T, Scarfe AD, Lund VL. Science-based assessment of welfare: aquatic animals. *Rev Sci Tech* 2005;24:529-547.
293. Burns R. Considerations in the euthanasia of reptiles, fish and amphibians, in *Proceedings*. Am Assoc Zoo Vet Wildl Dis Assoc Am Assoc Wildl Vet Joint Conf 1995;243-249.
294. Zwart P, de Vries HR, Cooper JE. The humane killing of fishes, amphibia, reptiles and birds. *Tijdschr Diergeneesk* 1989;114:557-565 [[in Dutch]].
295. Brown LA. Anesthesia and restraint. In: Stoskopf MK, ed. *Fish medicine*. Philadelphia: WB Saunders, 1993;79-90.
296. Roberts HE. Anesthesia, analgesia and euthanasia. In: Roberts HE, ed. *Fundamentals of ornamental fish health*. Ames, Iowa: Blackwell, 2010;166-171.
297. Saint-Erne N. Anesthesia. In: *Advanced koi care*. 2nd ed. Glendale, Ariz: Erne Enterprises, 2010;50-52.
298. Neiffer DL, Stamper MA. Fish sedation, anesthesia, analgesia, and euthanasia: considerations, methods, and types of drugs. *ILAR J* 2009;50:343-360.
299. Standing Committee of the European Convention for the Protection of Animals Kept for Farming Purposes. *Recommendations concerning farmed fish*. Strasbourg, France: European Convention for the Protection of Animals Kept for Farming Purposes, 2006.
300. Stetter MD. Fish and amphibian anesthesia. *Vet Clin North Am Exot Anim Pract* 2001;4:69-82.
301. US FDA Center for Veterinary Medicine. *Enforcement priorities for drug use in aquaculture*. Silver Spring, Md: US FDA, 2011. Available at: [www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/PoliciesProceduresManual/UCM046931.pdf](http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/PoliciesProceduresManual/UCM046931.pdf). Accessed Jan 10, 2011.
302. Ross LG, Ross B. *Anaesthetic and sedative techniques for aquatic animals*. 3rd ed. Oxford, England: Blackwell, 2008.
303. Rombough PJ. Ontogenetic changes in the toxicity and efficacy of the anaesthetic MS222 (tricaine methanesulfonate) in zebrafish (*Danio rerio*) larvae. *Comp Biochem Physiol A Mol Integr Physiol* 2007;148:463-469.
304. Canadian Council on Animal Care. *Guidelines on: the care and use of fish in research, teaching and testing*. Ottawa: Canadian Council on Animal Care, 2005. Available at: [www.cca.ca/Documents/Standards/Guidelines/Fish.pdf](http://www.cca.ca/Documents/Standards/Guidelines/Fish.pdf). Accessed Dec 19, 2010.
305. Readman GD, Owen SF, Knowles TG. Species specific anaesthetics for fish anaesthesia and euthanasia. *Sci Rep* 2017;7:7102.
306. Wong D, von Keyserlingk MAG, Richards JG, et al. Conditioned place avoidance of zebrafish (*Danio rerio*) to three chemicals used for euthanasia and anaesthesia. *PLoS One* 2014;9:e88030.
307. Balko JA, Oda A, Posner LP. Use of tricaine methanesulfonate or propofol for immersion euthanasia of goldfish (*Carassius auratus*). *J Am Vet Med Assoc* 2018;252:1555-1561.
308. Harms C. Anesthesia in fish. In: Fowler ME, Miller RE, eds. *Zoo and wild animal medicine: current therapy 4*. Philadelphia: WB Saunders Co, 1999;158-163.
309. Deitrich RA, Dunwiddie TV, Harris RA, et al. Mechanism of action of ethanol: initial central nervous system actions. *Pharmacol Rev* 1989;41:489-537.
310. Peng J, Wagle M, Mueller T, et al. Ethanol-modulated camouflage response screen in zebrafish uncovers a novel role for camp and extracellular signal-regulated kinase signaling in behavioral sensitivity to ethanol. *J Neurosci* 2009;29:8408-8418.
311. Dlugos CA, Rabin RA. Ethanol effects on three strains of zebrafish: model system for genetic investigations. *Pharmacol Behav* 2003;74:471-480.
312. Gerlai R, Lahav M, Guo S, et al. Drinks like a fish: zebra fish (*Danio rerio*) as a behavior genetic model to study alcohol effects. *Pharmacol Biochem Behav* 2000;67:773-782.
313. Gladden JN, Brainard BM, Shelton JL, et al. Evaluation of isoeugenol for anesthesia in koi carp (*Cyprinus carpio*). *Am J Vet Res* 2010;71:859-866.
314. Holloway A, Keene JL, Noakes DG, et al. Effects of clove oil and MS-222 on blood hormone profiles in rainbow trout *Oncorhynchus mykiss*, Walbaum. *Aquacult Res* 2004;35:1025-1030.
315. Lewbart GA. Fish. In: Carpenter JW, ed. *Exotic animal formulary*. 3rd ed. St Louis: Elsevier Saunders, 2005;5-29.
316. National Toxicology Program. *NTP technical report on the toxicology and carcinogenesis studies of isoeugenol (CAS No. 97-54-1) in F344/N rats and B6C3F1 mice (gavage studies)*. NTP TR 551. NIH publication No. 08-5892. Washington, DC: US Department of Health and Human Services, 2008. Available at: [ntp.niehs.nih.gov/files/TR551board\\_web.pdf](http://ntp.niehs.nih.gov/files/TR551board_web.pdf). Accessed May 16, 2011.
317. Sladky KK, Swanson CR, Stoskopf MK, et al. Comparative efficacy of tricaine methanesulfonate and clove oil for use as anesthetics in red pacu (*Piaractus brachyomus*). *Am J Vet Res* 2001;62:337-342.
318. Brodin P, Roed A. Effects of eugenol on rat phrenic nerve and phrenic-diaphragm preparations. *Arch Oral Biol* 1984;29:611-615.
319. Ingvast-Larsson JC, Axén VC, Kiessling AK. Effects of isoeugenol on in vitro neuromuscular blockade of rat phrenic nerve-diaphragm preparations. *Am J Vet Res* 2003;64:690-693.
320. FDA. *Concerns related to the use of clove oil as an anesthetic for fish*. Guidance for industry 150. Washington, DC: Department of Health and Human Services, 2007. Available at: [www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/ucm052520.pdf](http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/ucm052520.pdf). Accessed Jan 20, 2011.

321. Noga EJ. Pharmacopoeia. In: *Fish disease: diagnosis and treatment*. 2nd ed. Ames, Iowa: Wiley-Blackwell, 2010;375–420.
322. Davie PS, Kopf RK. Physiology, behaviour and welfare of fish during recreational fishing and after release. *N Z Vet J* 2006;54:161–172.
323. Van De Vis H, Kestin S, Robb D, et al. Is humane slaughter of fish possible for industry? *Aquacult Res* 2003;34:211–220.
324. Animal Procedures Committee. *Report of the Animal Procedures Committee for 2009*. London: The Stationery Office, 2010;27.
325. Murray MJ. Euthanasia. In: Lewbart GA, ed. *Invertebrate medicine*. Ames, Iowa: Blackwell, 2006;303–304.
326. Murray MJ. Invertebrates. In: *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;25–27.
327. Messenger JB, Nixon M, Ryan KP. Magnesium chloride as an anaesthetic for cephalopods. *Comp Biochem Physiol C* 1985;82:203–205.
328. Butler-Struben HM, Brophy SM, Johnson NA, et al. *In vivo* recording of neural and behavioral correlates of anesthesia induction, reversal, and euthanasia in cephalopod molluscs. *Front Physiol* 2018;9:109.
329. Ross LG, Ross B. Anaesthesia of aquatic invertebrates. In: *Anaesthetic and sedative techniques for aquatic animals*. 3rd ed. Oxford, England: Wiley Blackwell, 2008;167–176.
330. Andrews PLR, Darmaillacq AS, Dennison N, et al. The identification and management of pain, suffering and distress in cephalopods, including anesthesia, analgesia and humane killing. *J Exp Mar Biol Ecol* 2013;447:46–64.
331. Pugliese C, Mazza R, Andrews PLR, et al. Effect of different formulations of magnesium chloride used as anesthetic agents on the performance of the isolated heart of *Octopus vulgaris*. *Front Physiol* 2016;7:610.
332. Waterstrat PR, Pinkham L. Evaluation of eugenol as an anesthetic for the American lobster *Homarus americanus*. *J World Aquacult Soc* 2005;36:420–424.
333. Gunkel C, Lewbart GA. Invertebrates. In: West G, Heard D, Caulkett N, eds. *Zoo animal and wildlife immobilization and anesthesia*. Ames, Iowa: Blackwell, 2007;147–158.
334. Gleadall IG. The effects of prospective anaesthetic substances on cephalopods: summary of original data and a brief review of studies over the last two decades. *J Exp Mar Biol Ecol* 2013;447:23–30.
335. Gilbertson CR, Wyatt JD. Evaluation of euthanasia techniques for an invertebrate species, land snails (*Succinea putris*). *J Am Assoc Lab Anim Sci* 2016;55:577–581.
336. Reilly JS, ed. *Euthanasia of animals used for scientific purposes*. Adelaide, SA, Australia: Australia and New Zealand Council for the Care of Animals in Research and Teaching, Department of Environmental Biology, Adelaide University, 2001.
337. American Association of Zoo Veterinarians (AAZV). *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006.
338. Canadian Council on Animal Care. Guidelines on: the care and use of wildlife. Ottawa: Canadian Council on Animal Care, 2003. Available at: [ccac.ca/Documents/Standards/Guidelines/Wildlife.pdf](http://ccac.ca/Documents/Standards/Guidelines/Wildlife.pdf). Accessed Jul 2, 2011.
339. Fowler M. *Restraint and handling of wild and domestic animals*. 3rd ed. Ames, Iowa: Wiley-Blackwell, 2008.
340. West G, Heard D, Caulkett N. *Zoo Animal & wildlife immobilization and anesthesia*. Ames, Iowa: Blackwell, 2007.
341. Kreeger TJ, Arnemo J. *Handbook of wildlife chemical immobilization*. International ed. Fort Collins, Colo: Wildlife Pharmaceuticals Inc, 2002.
342. Clark RK, Jessup DA. *Wildlife restraint series*. Fort Collins, Colo: International Wildlife Veterinary Services, 1992.
343. Platnick NI. American Museum of Natural History research sites. The world spider catalog, version 13.0. Available at: [research.amnh.org/entomology/spiders/catalog/index.html](http://research.amnh.org/entomology/spiders/catalog/index.html). Accessed Aug 14, 2012.
344. Ruppert E, Fox R, Barnes R. *Invertebrate zoology: a functional evolutionary approach*. 7th ed. Thomson Learning, 2007.
345. Murray MJ. Euthanasia. In: Lewbart GA, ed. *Invertebrate medicine*. 2nd ed. Ames, Iowa: Wiley-Blackwell, 2011;441–444.
346. Braun ME, Heatley JJ, Chitty J. Clinical techniques of invertebrates. *Vet Clin North Am Exot Anim Pract* 2006;9:205–221.
347. Cooper JE. Anesthesia, analgesia and euthanasia of invertebrates. *ILAR J* 2011;52:196–204.
348. Gunkel C, Lewbart GA. Anesthesia and analgesia of invertebrates. In: Fish R, Danneman P, Brown M, et al, eds. *Anesthesia and analgesia in laboratory animals*. 2nd ed. San Diego: Academic Press, 2008;535–546.
349. Lewbart GA, ed. *Invertebrate medicine*. Oxford, England: Blackwell, 2006.
350. Pizzi R, Spiders. In: Lewbart GA, ed. *Invertebrate medicine*. Ames, Iowa: Blackwell, 2006;143–168.
351. Pizzi R, Cooper JE, George S. Spider health, husbandry, and welfare in zoological collections, in *Proceedings*. Br Vet Zool Soc Conf Stand Welf Conserv Zoo Exot Pract 2002;54–59.
352. Baier J. Amphibians. In: *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;39–41.
353. Burns R, McMahan B. Euthanasia methods for ectothermic vertebrates. In: Bonagura JD, ed. *Continuing veterinary therapy XII*. Philadelphia: WB Saunders Co, 1995;1379–1381.
354. Baier J. Reptiles. In: *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;42–45.
355. Universities Federation for Animal Welfare. *Humane killing of animals*. 4th ed. South Mimms, Potters Bar, England: Universities Federation for Animal Welfare, 1988;16–22.
356. Cooper JE, Ewbank R, Platt C, et al. *Euthanasia of amphibians and reptiles*. London: Universities Federation for Animal Welfare and World Society for the Protection of Animals, 1989.
357. Mader DR. Euthanasia. In: Mader DR, ed. *Reptile medicine and surgery*. St Louis: Saunders/Elsevier, 2006;564–568.
358. Gentz EJ. Medicine and surgery of amphibians. *ILAR J* 2007;48:255–259.
359. National Research Committee on Pain and Distress in Laboratory Animals, Institute of Laboratory Animal Resources, Commission on Life Sciences, National Research Council. *Recognition and alleviation of pain and distress in laboratory animals*. Washington, DC: National Academy Press, 1992.
360. Andrews EJ, Bennet BT, Clark JD, et al. 1993 report of the AVMA Panel on Euthanasia. *J Am Vet Med Assoc* 1993;202:229–249.
361. Heard DJ. Principles and techniques of anesthesia and analgesia for exotic practice. *Vet Clin North Am Small Anim Pract* 1993;23:1301–1327.
362. Conroy CJ, Papenfuss T, Parker J, et al. Use of tricaine methanesulfonate (MS-222) for euthanasia of reptiles. *J Am Assoc Lab Anim Sci* 2009;48:28–32.
363. Harrell L. Handling euthanasia in production facilities. In: Schaeffer DO, Kleinow KM, Krulisch L, eds. *The care and use of amphibians, reptiles and fish in research*. Bethesda, Md: Scientists Center for Animal Welfare, 1992;129.
364. Letcher J. Intracelomic use of tricaine methane sulfonate for anesthesia of bullfrogs (*Rana catesbeiana*) and leopard frogs (*Rana pipiens*). *Zoo Biol* 1992;11:243–251.
365. Canadian Council on Animal Care. *CCAC guidelines on: euthanasia of animals used in science*. Ottawa: Canadian Council on Animal Care, 2010. Available at: [www.ccac.ca/Documents/Standards/Guidelines/Euthanasia.pdf](http://www.ccac.ca/Documents/Standards/Guidelines/Euthanasia.pdf). Accessed Jul 2, 2011.
366. Breazile JE, Kitchell RL. Euthanasia for laboratory animals. *Fed Proc* 1969;28:1577–1579.
367. Stoskopf MK. Anesthesia. In: Brown LA, ed. *Aquaculture for veterinarians: fish husbandry and medicine*. Oxford, England: Pergamon Press, 1993;161–167.
368. Storey KB. Life in a frozen state: adaptive strategies for natu-

- ral freeze tolerance in amphibians and reptiles. *Am J Physiol* 1990;258:R559–R568.
369. Brannian RE, Kirk E, Williams D. Anesthetic induction of kinosternid turtles with halothane. *J Zoo Anim Med* 1987;18:115–117.
  370. Jackson OF, Cooper JE. Anesthesia and surgery. In: Cooper JE, Jackson OF, eds. *Diseases of the reptilia*. Vol 2. New York: Academic Press Inc, 1981;535–549.
  371. Calderwood HW. Anesthesia for reptiles. *J Am Vet Med Assoc* 1971;159:1618–1625.
  372. Moberly WR. The metabolic responses of the common iguana, *Iguana iguana*, to walking and diving. *Comp Biochem Physiol* 1968;27:21–32.
  373. Johlin JM, Moreland FB. Studies of the blood picture of the turtle after complete anoxia. *J Biol Chem* 1933;103:107–114.
  374. Nevarez JG, Strain GM, da Cunha AF, et al. Evaluation of four methods for inducing death during slaughter of American alligators (*Alligator mississippiensis*). *Am J Vet Res* 2014;75:536–543.
  375. Storey KB, Storey JM. Natural freezing survival in animals. *Annu Rev Ecol Syst* 1996;27:365–386.
  376. Machin KL. Amphibian pain and analgesia. *J Zoo Wildl Med* 1999;30:2–10.
  377. Stevens CW, Pezalla PD. Endogenous opioid system down-regulation during hibernation in amphibians. *Brain Res* 1989;494:227–231.
  378. Martin BJ. Evaluation of hypothermia for anesthesia in reptiles and amphibians. *ILAR J* 1995;37:186–190.
  379. Suckow MA, Terril LA, Grigdesby CF, et al. Evaluation of hypothermia-induced analgesia and influence of opioid antagonists in Leopard frogs (*Rana pipiens*). *Pharmacol Biochem Behav* 1999;63:39–43.
  380. Schaffer DO. Anesthesia and analgesia in nontraditional laboratory animal species. In: Kohn DF, Wixson SK, White WJ, et al. eds. *Anesthesia and analgesia in laboratory animals*. San Diego: Academic Press, 1997;337–378.
  381. Harms CA, Greer LL, Whaley J, et al. Euthanasia. In: Gulland FMD, Dierauf LA, eds. *Marine mammal medicine*. 3rd ed. Boca Raton, Fla: CRC Press Inc, 2018;675–691.
  382. Harms CA, McLellan WA, Moore MJ, et al. Low-residue euthanasia of stranded mysticetes. *J Wildl Dis* 2014;50:63–73.
  383. Lockwood G. Theoretical context-sensitive elimination times for inhalational anaesthetics. *Br J Anaesth* 2010;104:648–655.
  384. Drew ML. Wildlife issues. In: *Guidelines for the euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006;19–22.
  385. Schwartz JA, Warren RJ, Henderson DW, et al. Captive and field tests of a method for immobilization and euthanasia of urban deer. *Wildl Soc Bull* 1997;25:532–541.
  386. Hyman J. Euthanasia in marine mammals. In: Dierauf LA, ed. *Handbook of marine mammal medicine: health, disease and rehabilitation*. Boca Raton, Fla: CRC Press Inc, 1990;265–266.
  387. Needham DJ. Cetacean strandings. In: Fowler ME, ed. *Zoo and wild animal medicine: current therapy* 3. 3rd ed. Philadelphia: WB Saunders Co, 1993;415–425.
  388. Gullett PA. Euthanasia. In: Friend M, ed. *Field guide to wildlife diseases. Volume 1: general field procedures and diseases of migratory birds*. Resource publication #167. Washington, DC: US Department of the Interior, Fish and Wildlife Service, 1987;59–63.
  389. Fair JM. *Guidelines for the use of wild birds in research*. 3rd ed. Washington, DC: The Ornithological Council, 2010.
  390. Sikes RS, Gannon WL, Animal Care and Use Committee of the American Society of Mammalogists. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. *J Mammal* 2011;92:235–253.
  391. Herpetological Animal Care and Use Committee. *Guidelines for use of live amphibians and reptiles in field and laboratory research*. Miami: American Society of Ichthyologists and Herpetologists, 2004.
  392. Orlans FB. *Field research guidelines: impact on animal care and use committees*. Bethesda, Md: Scientists Center for Animal Welfare, 1988.
  393. McClure DN, Anderson N. Rodents and small mammals. In: *Guidelines for euthanasia of nondomestic animals*. Yulee, Fla: American Association of Zoo Veterinarians, 2006; 61–65.
  394. Brakes P, Butterworth A, Donoghue M. *Investigating criteria for insensibility and death in firearms for euthanising stranded cetaceans in New Zealand*. IWC/58/WKM&AWI 9. Agenda item 5.2.4. Impington, England: International Whaling Commission, 2006.
  395. Moore M, Walsh M, Bailey J, et al. Sedation at sea of entangled North Atlantic right whales (*Eubalaena glacialis*) to enhance disentanglement. *PLoS One* 2010;5:e9597.
  396. Dunn JL. Multiple-agent euthanasia of a juvenile fin whale, *Balaenoptera physalus*. *Mar Mamm Sci* 2006;22:1004–1007.
  397. Hampton JO, Mawson PR, Coughran DK, et al. Validation of the use of firearms for euthanising stranded cetaceans. *J Cetacean Res Manag* 2014;14:117–123.
  398. Øen EO, Knudsen SK. Euthanasia of whales: the effect of .375 and .458 calibre round-nosed, full metal-jacketed rifle bullets on the central nervous system of common minke whales. *J Cetacean Res Manag* 2007;9:81–88.
  399. Donoghue M. *IWC 58: workshop on whale killing methods and associated welfare issues cetaceans in New Zealand*. IWC/58/WKM&AWI 10. Agenda item 4.4. Impington, England: International Whaling Commission, 2006.
  400. Lawrence K. Euthanasia of stranded whales. *Vet Rec* 2003;153:540.
  401. Bonner WN. Killing methods. In: Laws RM, ed. *Antarctic seals: research methods and techniques*. Cambridge, England: Cambridge University Press, 1993;150–160.
  402. Sweeney JC. What practitioners should know about whale strandings. In: Kirk RW, ed. *Kirk's current veterinary therapy* 10. Philadelphia: WB Saunders Co, 1989;721–727.
  403. Blackmore DK, Madie P, Bowling MC, et al. The use of a shotgun for emergency slaughter of stranded cetaceans. *N Z Vet J* 1995;43:158–159.
  404. Daoust PY, Crook A, Bollinger TK, et al. Animal welfare and the harp seal hunt in Atlantic Canada. *Can Vet J* 2002;43:687–694.
  405. Coughran D, Stiles I, Fuller PJ. Euthanasia of beached humpback whales using explosives. *J Cetacean Res Manag* 2012;12:137–144.
  406. International Whaling Commission. *Report of the workshop on welfare issues associated with the entanglement of large whales*. IWC/62/15. Agenda item 5.2.1. Impington, England: International Whaling Commission, 2010.
  407. Daoust PY, Ortenburger AI. Successful euthanasia of a juvenile fin whale. *Can Vet J* 2001;42:127–129.

## Glossary

- Acceptable:** A method considered to reliably meet the requirements of euthanasia. See EUTHANASIA.
- Acceptable With Conditions:** A method considered to reliably meet the requirements of euthanasia when specified conditions are met. See EUTHANASIA.
- Adjunctive Method:** A method of assuring death that may be used after an animal has been made unconscious.
- Affect:** The external expression of emotion.
- Altricial:** Immobile, blind, naked young animals (including but not limited to birds and some rodents) requiring parental care and feeding.
- Anesthesia, General:** A method used to produce unconsciousness. See UNCONSCIOUSNESS.
- Animal:** Any nonhuman animal (Kingdom: Animalia).
- Aversion:** A desire to avoid or retreat from a stimulus.
- Avian:** Relating to birds.
- Captive Bolt:** A device used to kill or stun animals where a tethered metal rod is discharged into the brain of the animal.
- Chick:** A young bird.
- Cremation:** To incinerate a dead body. See INCINERATION.
- Depopulation:** The rapid destruction of a population of animals in response to urgent circumstances with as much consideration given to the welfare of the animals as practicable.
- Distress:** The effect of stimuli that initiate adaptive responses that are not beneficial to the animal—thus, the animal's response to stimuli interferes with its welfare and comfort.
- Ectotherm:** An organism that is dependent on environmental heat sources for regulating its body temperature.
- Eustress:** The effect of stimuli that initiate adaptive responses that are beneficial to the animal.
- Euthanasia:** A method of killing that minimizes pain, distress, and anxiety experienced by the animal prior to loss of consciousness, and causes rapid loss of consciousness followed by cardiac or respiratory arrest and death (see sections I3, I5, I6).
- Exsanguination:** The action of draining an animal of blood.
- Fear:** An unpleasant emotional experience caused by an awareness of a threat of danger.
- Feral:** A free-roaming, unowned animal of a domestic species that has reverted to wild behavior.
- Field Conditions:** Any situation outside of a controlled or clinical environment.
- Finfish:** a term used to describe true fish as opposed to other non-fish aquatic animals such as the invertebrates “starfish” and “cuttlefish”
- Good Death:** see EUTHANASIA.
- Harvest:** The act or process of killing an animal for food or other products.
- Humane Killing:** Killing performed in a manner that minimizes animal distress, but may not meet the requirements of euthanasia due to situational constraints.
- Incineration:** To burn completely, to ashes.
- Insensible:** See UNCONSCIOUS.
- Livestock:** Domestic animals raised for use, consumption, or profit, typically on a farm.
- Nociception:** Neuronal impulses generated by noxious stimuli, which threaten to, or actually do, destroy tissue. Nociception can occur without consequential pain perception.
- Pain:** A sensation (perception) that results from nociceptive nerve impulses reaching areas of the brain capable of conscious perception via ascending neural pathways.
- Pithing:** Physical destruction of the brain with a wire, air jet, or rod.
- Poikilotherm:** An animal with a variable internal temperature. These animals are generally ectothermic.
- Poult:** A young fowl.
- Poultry:** Domestic fowl raised for meat or eggs, such as chickens, turkeys, ducks, or geese.
- Precocious:** Capable of a high degree of independent activity (ie, mobility, feeding) from birth.
- Secondary Method:** A euthanasia method employed subsequent to a primary method to ensure death of an unconscious animal before it can recover consciousness. See ADJUNCTIVE METHOD.
- Sedation:** A state of CNS depression in which the animal is awake but calm, and with sufficient stimuli may be aroused.
- Slaughter:** Killing animals for the purposes of harvesting commodities such as meat or hides.
- Stress:** The effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's homeostasis or adaptive state.
- Stunning:** Rendering an animal unconscious by use of a physical, gas, or electrical method.
- Suffocate:** To kill by preventing access to air or oxygen.
- Unacceptable:** A method that does not meet the requirements of euthanasia. See EUTHANASIA.
- Unconsciousness:** Unconsciousness, defined as loss of individual awareness. This occurs when the brain's ability to integrate information is blocked or disrupted. Onset of unconsciousness is associated with loss of the righting reflex. An unconscious animal is therefore recumbent and, by definition, unable to perceive pain; however, unconscious animals may respond to noxious stimulation with spinally mediated involuntary movements depending on the degree of CNS depression present.
- Wild:** A free-roaming animal of a nondomestic species.

## Appendix I

Agents and methods of euthanasia by species.

Species	Acceptable	Acceptable with conditions (for adjunctive methods, see text)
Aquatic invertebrates	S6.3: Immersion in anesthetic solution (magnesium salts, clove oil, eugenol, ethanol)	S6.3: Adjunctive methods (second step) include 70% alcohol and neutral-buffered 10% formalin, pithing, freezing, boiling
Amphibians	S7.3: As appropriate by species—Injected barbiturates, dissociative agents and anesthetics as specified, topical or injected buffered MS 222 or topical benzocaine hydrochloride	S7.3: As appropriate by species—Inhaled anesthetics as specified, CO <sub>2</sub> , PCB or firearm, manually applied blunt force trauma to the head, rapid freezing of small (< 4 g [0.1 oz]) individuals where immediate death occurs
Avians (See also Poultry)	S5: IV barbiturates	S5: Inhaled anesthetics, CO <sub>2</sub> , CO, N <sub>2</sub> , Ar, cervical dislocation (small birds and poultry), decapitation (small birds) S7.6: Gunshot (free-ranging birds)
Cats	S1: IV barbiturates, injected anesthetic overdose Tributame, T-61	S1: Barbiturates (alternate routes of administration), inhaled anesthetic overdose, CO,* CO <sub>2</sub> ,* gunshot*
Cattle	S3.2: IV barbiturates	S3.2: Gunshot, PCB
Dogs	S1: IV barbiturates, injected anesthetic overdose Tributame, T-61	S1: Barbiturates (alternate routes of administration), inhaled anesthetic overdose, CO,* CO <sub>2</sub> ,* gunshot,* PCB*
Fish	S6.2: Immersion in buffered benzocaine or benzocaine hydrochloride, isoflurane, sevoflurane, quinaldine sulfate, buffered MS 222, 2-phenoxyethanol, injected pentobarbital, rapid chilling (appropriate species), ethanol	S6.2: Eugenol, isoeugenol, clove oil, CO <sub>2</sub> -saturated water, decapitation/cervical transection/manually applied blunt force trauma followed by pithing or exsanguination, maceration (research setting), captive bolt (large fish)
Equids	S4: IV barbiturates	S4: PCB, gunshot
Marine mammals	S7.5 (captive): Injected barbiturates S7.7 (free ranging): Injected barbiturates or anesthetic overdose	S7.5 (captive): Inhaled anesthetics S7.7 (free ranging): Gunshot, manually applied blunt force trauma, implosive decerebration
Nonhuman primates	S2.3, S7.4: Injected barbiturates or anesthetic overdose	S2.3, S7.4 (as appropriate by species): Inhaled anesthetic, CO, CO <sub>2</sub>
Poultry	S3.4: Injected barbiturates and anesthetic overdose	S3.4: CO <sub>2</sub> , CO, N <sub>2</sub> , Ar, low-atmospheric-pressure stunning, cervical dislocation (as anatomically appropriate), decapitation, manual blunt force trauma, electrocution, gunshot, captive bolt
Rabbits	S2.4: IV barbiturates	S2.4: Inhaled anesthetic overdose, CO <sub>2</sub> , cervical dislocation (as anatomically appropriate), PCB, NPCB
Reptiles	S7.3: As appropriate by species—Injected barbiturates/MS 222, dissociative agents with adjunctive method and anesthetics as specified	S7.3: As appropriate by species—Inhaled anesthetics as specified, CO <sub>2</sub> , PCB or firearm, manually applied blunt force trauma, rapid freezing for animals < 4 g where immediate death occurs, spinal cord severance/destruction of brain (crocodilians)
Rodents	S2.2: Injected barbiturates and barbiturate combinations, dissociative agent combinations	S2.2: Inhaled anesthetics, CO <sub>2</sub> , CO, tribromoethanol, ethanol, cervical dislocation, decapitation, focused beam microwave irradiation
Small ruminants	S3.2: Injected barbiturates	S3.2: CO <sub>2</sub> (goat kids), Gunshot, PCB, NPCB (goat kids)
Swine	S3.3: Injected barbiturates	S3.3: CO <sub>2</sub> , CO, NO, N <sub>2</sub> , Ar, gunshot, electrocution, PCB, NPCB (piglets), manually applied blunt force trauma

\*Not recommended for routine use.

## Appendix 2

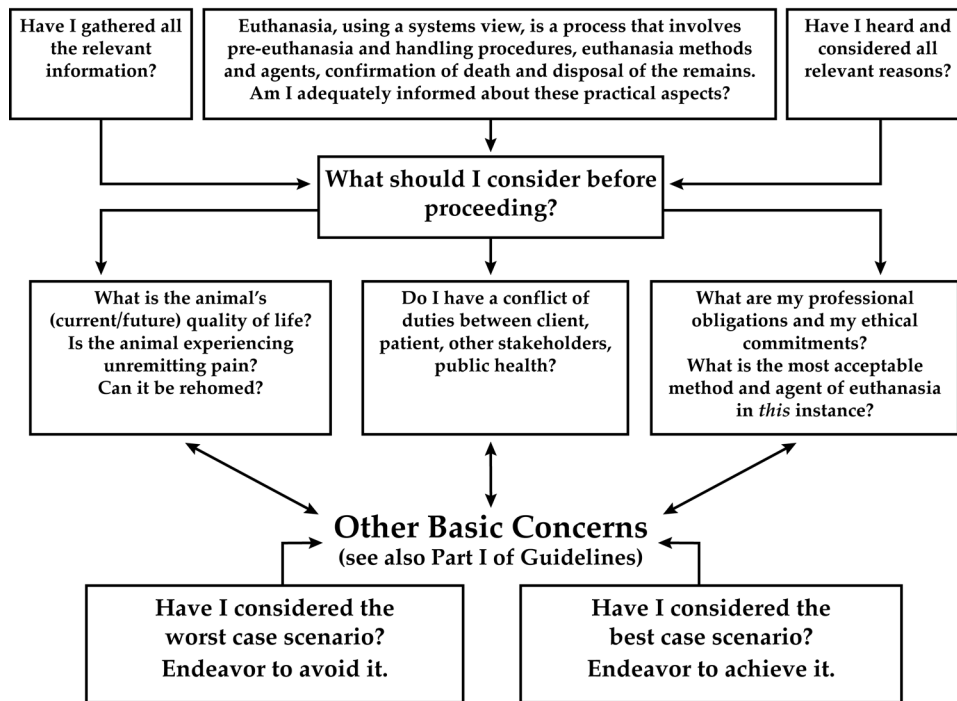
Some agents and methods that are unacceptable as primary methods of euthanasia.

Agent or method	Comments
Air embolism	Air embolism may be accompanied by convulsions, opisthotonos, and vocalization. If used, it should be done only in anesthetized animals.
Asphyxiation	Physically preventing respiration (smothering, strangulation, dewatering) is unacceptable.
Burning	Chemical or thermal burning of an animal is not an acceptable method of euthanasia.
Chloral hydrate	Unacceptable in dogs, cats, and small mammals.
Chloroform	Chloroform is a known hepatotoxin and suspected carcinogen and, therefore, is extremely hazardous to personnel.
Cyanide	Cyanide poses an extreme danger to personnel and the manner of death is aesthetically objectionable.
Decompression (excluding low atmospheric pressure stunning when it can be demonstrated that it achieves euthanasia)	Decompression is unacceptable for euthanasia because of numerous disadvantages. (1) Many chambers are designed to produce decompression at a rate 15–60 times as fast as the recommended optimum for animals, resulting in pain and distress attributable to expanding gases trapped in body cavities. (2) Immature animals are tolerant of hypoxia, and longer periods of decompression are required before respiration ceases. (3) Accidental recompression, with recovery of injured animals, can occur. (4) Bleeding, vomiting, convulsions, urination, and defecation, which are aesthetically unpleasant, may develop in unconscious animals.
Drowning	Drowning is not a means of euthanasia and is inhumane.
Exsanguination	Because of the anxiety associated with extreme hypovolemia, exsanguination as a sole method of killing should be used only on unconscious animals.
Formaldehyde	Direct immersion of an animal into formalin, as a means of euthanasia, is inhumane with the exception of Porifera.
Household products and solvents	Acetone, cleaning agents, quaternary compounds (including CCl <sub>4</sub> ), laxatives, pesticides, dimethylketone, quaternary ammonium products, antacids, and other toxicants not specifically designed for therapeutic or euthanasia use are not acceptable.
Hypothermia	Hypothermia is not an appropriate method of euthanasia.
Insulin	Insulin causes hypoglycemia, which can lead to considerable distress (behavior changes, irritability, disorientation) before onset of hypoglycemic seizures, which may or may not result in death.
Magnesium sulfate and potassium chloride	Unacceptable for use as euthanasia agents in conscious vertebrate animals.
Manually applied blunt force trauma to the head	Generally unacceptable for most species excluding piglets and small laboratory animals. Replace, as much as possible, manually applied blunt force trauma to the head with alternate methods.
Neuromuscular blocking agents (nicotine, magnesium sulfate, potassium chloride, and all curariform agents)	When used alone, these drugs all cause respiratory arrest before loss of consciousness, so the animal may perceive pain and distress after it is immobilized.
Rapid freezing	Rapid freezing as a sole means of euthanasia is not considered to be humane with the exception of small (< 4 g) reptiles, amphibians, and < 5-day-old rodent neonates where immediate death occurs. In all other cases animals should be rendered dead or unconscious prior to freezing. (Rapid chilling of fish is not considered to be rapid freezing).
Strychnine	Strychnine causes violent convulsions and painful muscle contractions.
Thoracic compression	Not acceptable for use on a conscious animal.

## Appendix 3

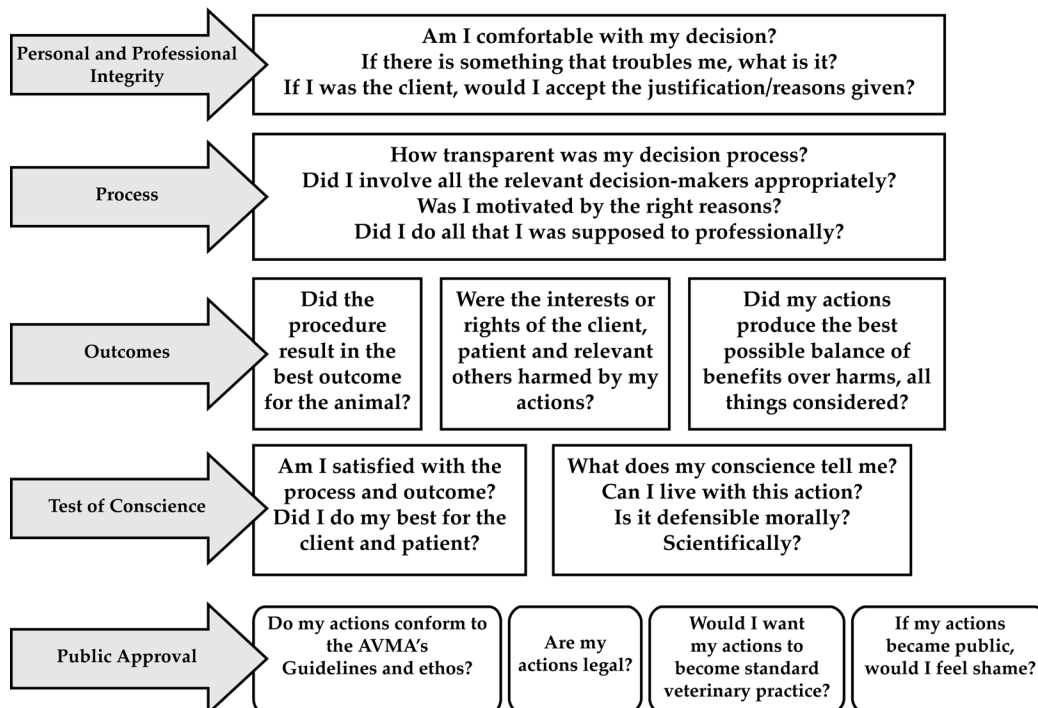
Images for the AVMA Guidelines for the Euthanasia of Animals: 2020 Edition (illustrations by Louis Clark, bio-graphix.com).

### Making a Decision Regarding Euthanasia

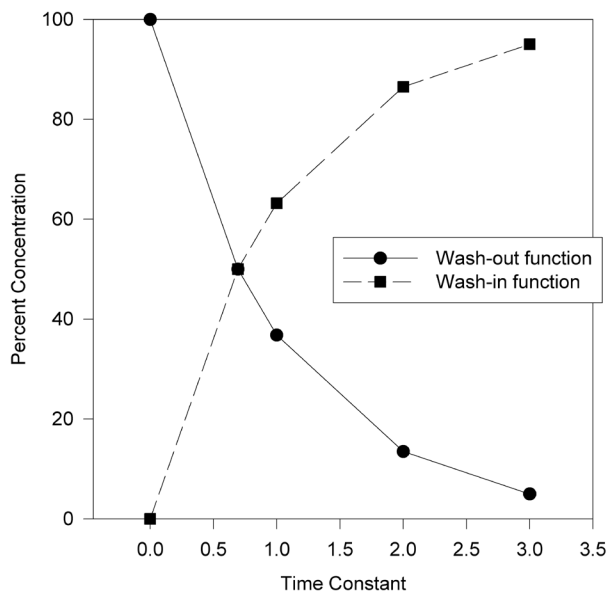


**Figure 1**—Veterinarians may appeal to this decision tree as a way to decide whether euthanasia is warranted when the proper course of action is not clear.

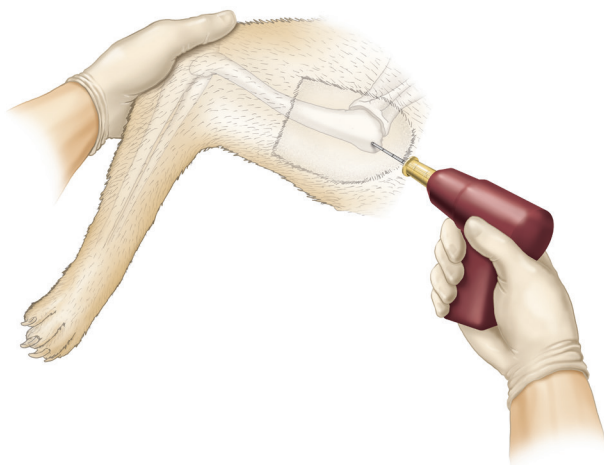
### Evaluating the Morality of My Decision



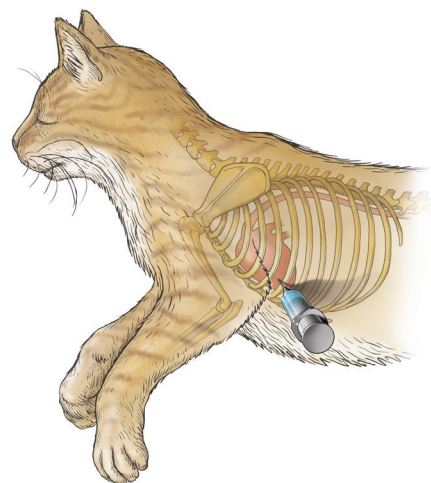
**Figure 2**—When attempting to make the best decision possible in a thorough and balanced way, veterinarians may find this decision matrix helpful. It can assist in assessing the morality of euthanasia in particular cases, especially if they are less straightforward.



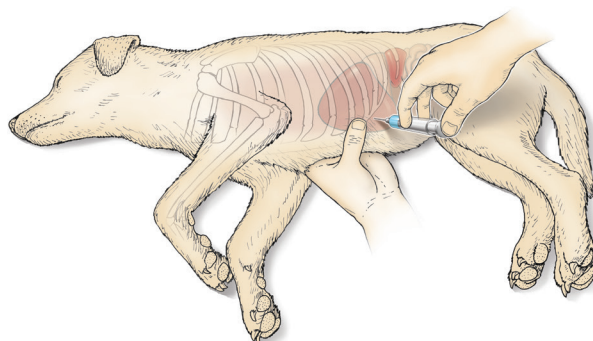
**Figure 3**—Graphic representation of the wash-in and wash-out exponential functions, using a hypothetical example of a closed container, originally filled with gas A into which gas B is introduced. The wash-in and wash-out functions are used to determine the time constant for the enclosed volume or space. The gas concentration within the container can be readily determined from the time constant, which is calculated by dividing the container volume by the gas displacement rate. Figure taken from Meyer RE, Morrow WEM. Carbon dioxide for emergency on-farm euthanasia of swine. *Journal of Swine Health and Production* 2005;13(4):210–217, 2005. Reprinted with permission.



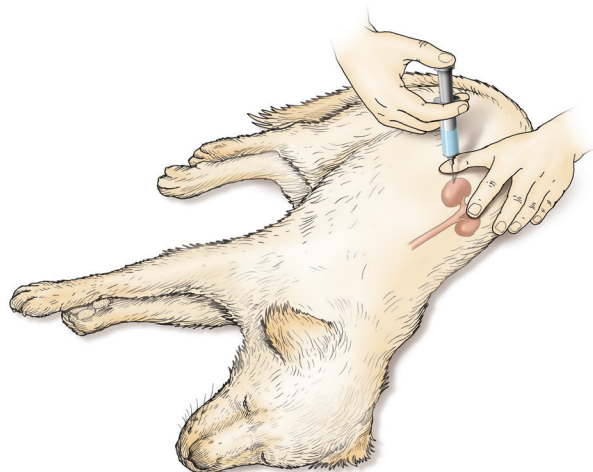
**Figure 4**—One recommended site (greater tubercle of the humerus) for administration of an intraosseous injection in adult dogs, using a bone injection gun. An alternative is to use a Jamshidi bone marrow needle or, in very young dogs, a hypodermic needle.



**Figure 5**—Site for administration of intracardiac injections in the cat. Intracardiac injection is appropriate only in unconscious or anesthetized animals.

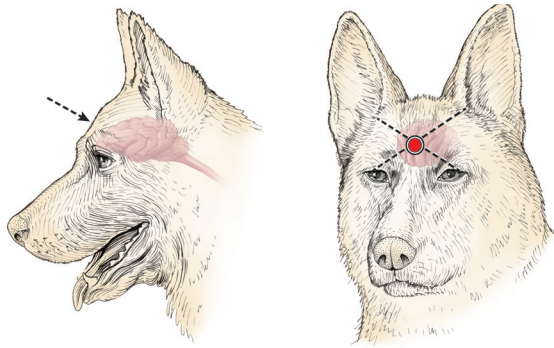


**Figure 6**—Site for administration of intrahepatic and intrasplenic injections in the dog. In this figure, the liver is being injected; the spleen is depicted in red caudal to the liver and stomach. Intrahepatic and intrasplenic injections are appropriate only in unconscious or anesthetized animals with the exception of intrahepatic injections in cats as discussed in the text.

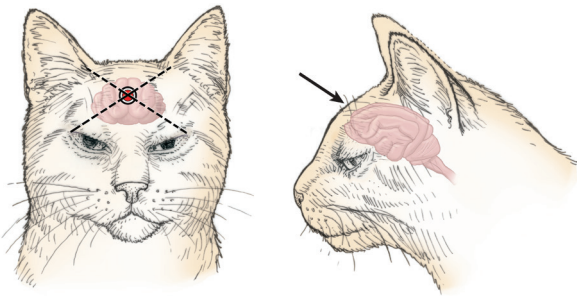


**Figure 7**—Site for administration of an intrarenal injection in the dog. Intrarenal injection is appropriate only in anesthetized or unconscious animals.

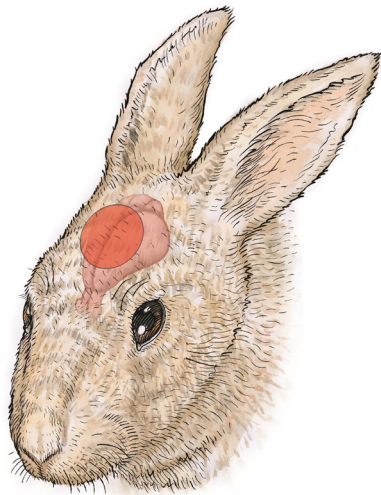




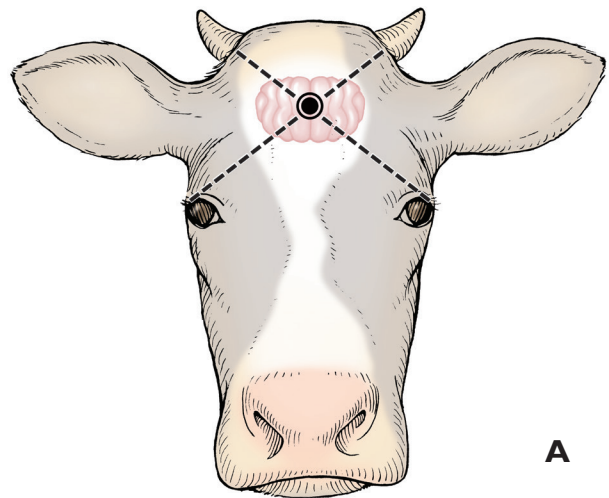
**Figure 8**—Anatomic site for gunshot in dogs is located midway between the level of the eyes and base of the ears, slightly off midline with aim directed across the dog toward the spine. (Based on Longair JA, Finley GG, Laniel MA, et al. Guidelines for the euthanasia of domestic animals by firearms. *Can Vet J* 1991;32:724–726.)



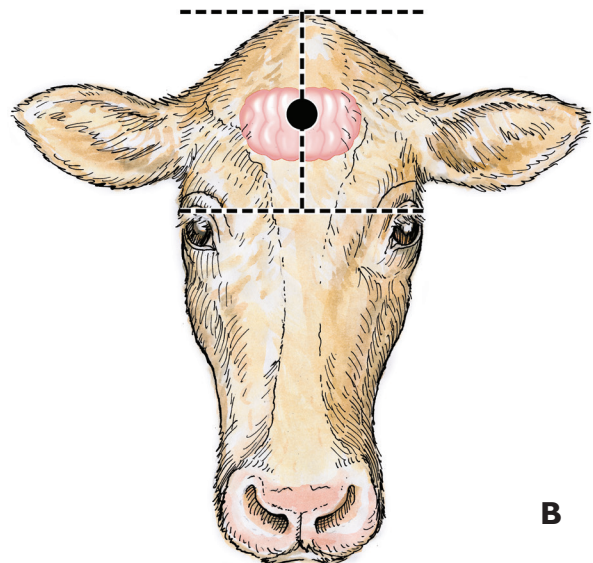
**Figure 9**—Anatomic site for gunshot in cats is a point slightly ventral to a line drawn between the medial bases of the ears (based on Longair JA, Finley GG, Laniel MA, et al. Guidelines for the euthanasia of domestic animals by firearms. *Can Vet J* 1991;32:724–726) or the intersection of lines drawn between lateral canthi of the eyes and medial bases of ears as shown.



**Figure 10**—Anatomic site for placement of a captive bolt in rabbits. The device should be placed in the center of the forehead, with the barrel in front of the ears and behind the eyes. The device should be discharged twice in rapid succession at the pressure recommended for the age and size of the rabbit. (Walsh JL, Percival A, Turner PV. Efficacy of blunt force trauma, a novel mechanical cervical dislocation device, and a non-penetrating captive bolt device for on-farm euthanasia of pre-weaned kits, growers, and adult commercial meat rabbits. *Animals (Basel)* 2017;7:100.)

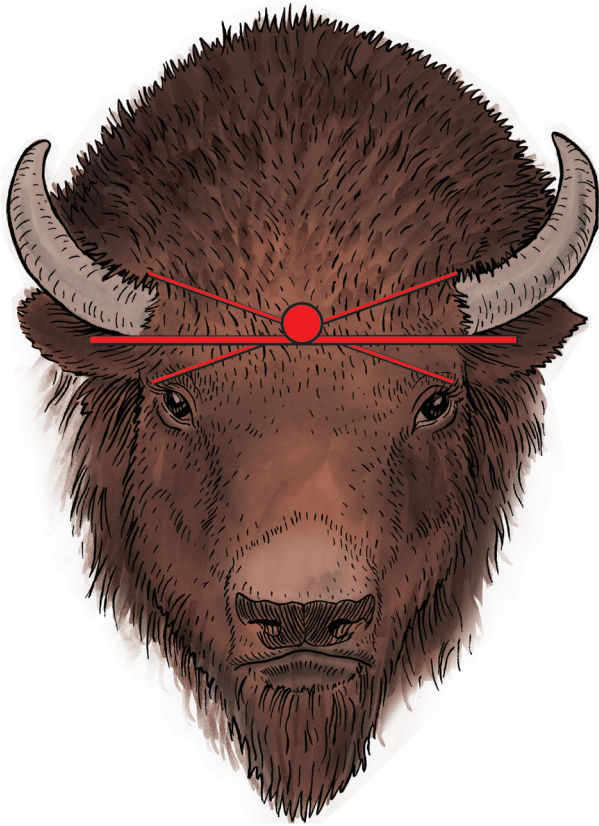


**A**

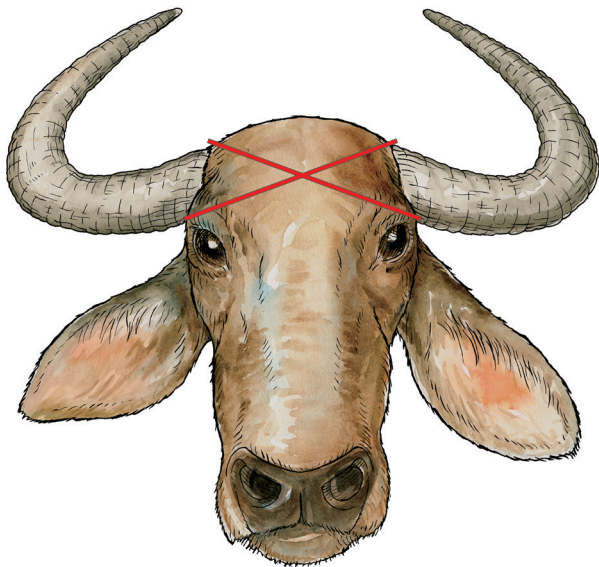


**B**

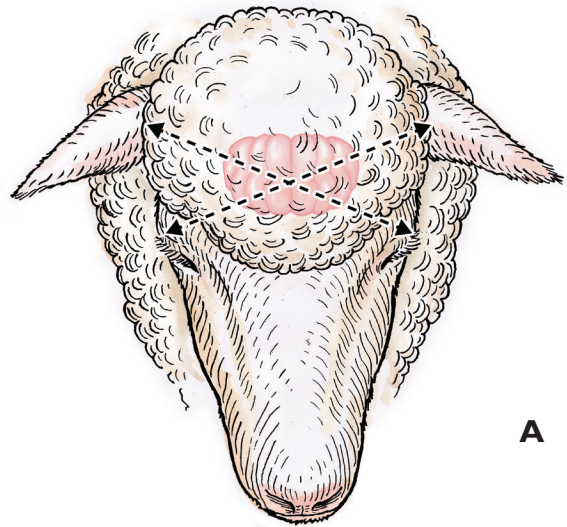
**Figure 11**—Anatomic site for gunshot or placement of a captive bolt and desired path of the projectile in cattle. The point of entry of the projectile should be at the intersection of 2 imaginary lines, each drawn from the outside corner of the eye to the center of the base of the opposite horn (A). Alternatively in long-faced cattle or young stock (B), a point on the midline of the face that is halfway between the top of the poll and an imaginary line connecting the outside corners of the eyes can be used (AVMA Guidelines for the Humane Slaughter of Animals: 2016 Edition).



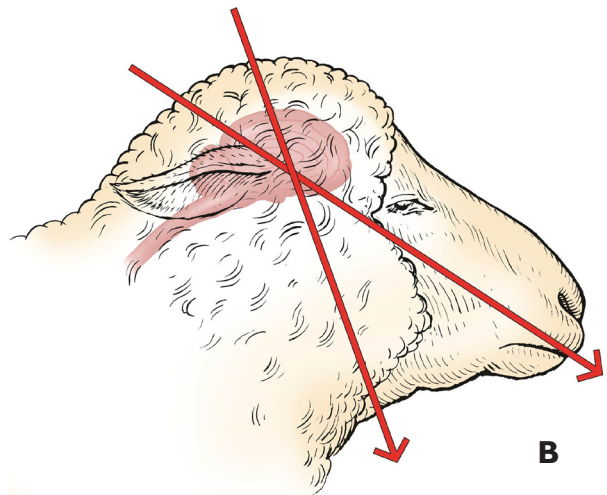
**Figure 12**—Similar to cattle, for American bison, the preferred site for gunshot euthanasia is on the forehead approximately 2.5 cm (1 inch) above an imaginary line connecting the bottom of the horns. The angle of entry should be perpendicular to the skull.



**Figure 13**—For water buffalo, the preferred anatomic site for gunshot or placement of a captive bolt is the intersection of 2 imaginary lines, each drawn from the lower edge of the horn to the upper edge of the opposite horn.

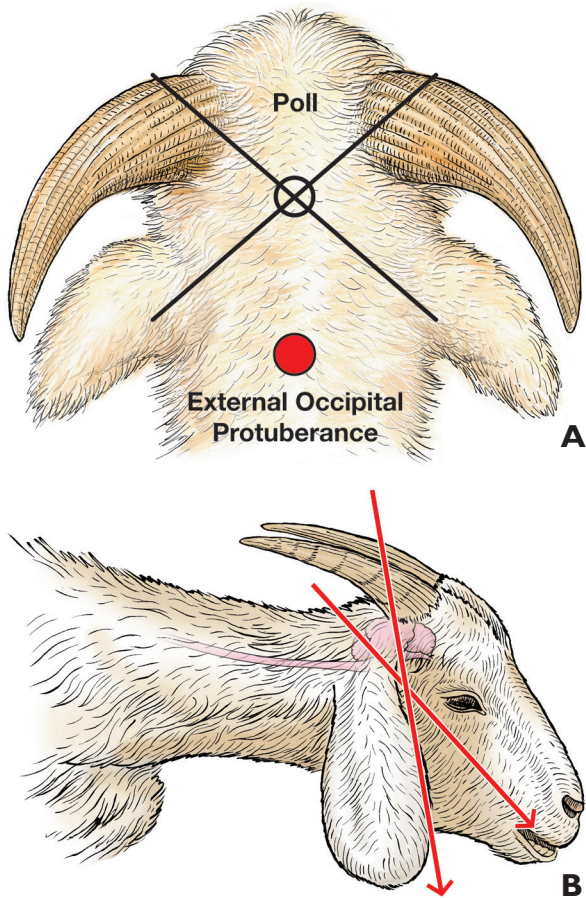


**A**

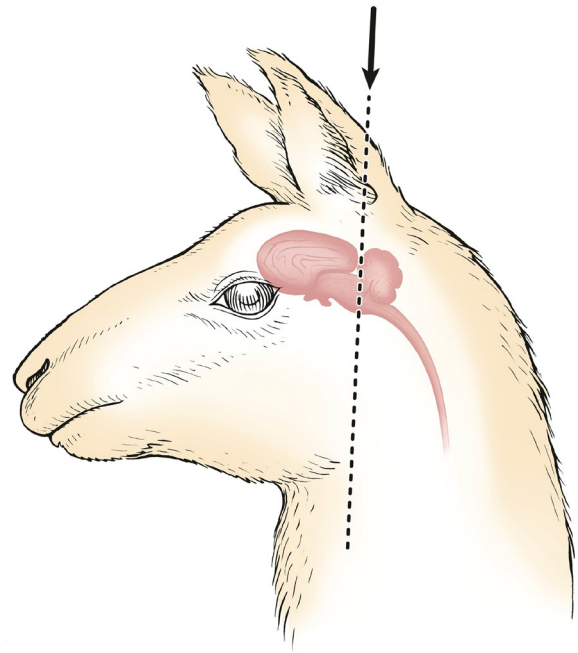


**B**

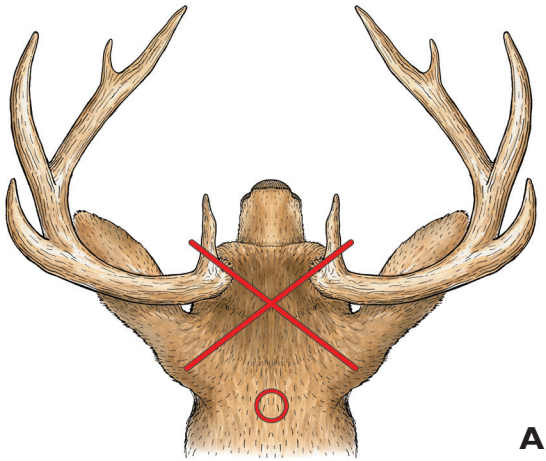
**Figure 14**—For polled sheep or goats (A), place the PCB perpendicular to the skull over the anatomic site identified as slightly caudal to the poll (the crown or the highest point on the head) at the intersection of 2 lines drawn from the outside corner of each eye to the middle of the base of the opposite ear. Alternatively, a site located on the dorsal midline of the head, which corresponds with the external occipital protuberance of the skull, may be used. When using the site associated with the external occipital protuberance, place the PCB flush with the skull at the external occipital protuberance while angling or aiming the muzzle of the PCB toward the mouth. Panel B indicates direction. (Based on observations in goats by Collins SL, Caldwell M, Hecht S, et al. Comparison of penetrating and nonpenetrating captive bolt methods in horned goats. *Am J Vet Res* 2017;78:151–157; and by Plummer PJ, Shearer JK, Kleinhenz KE, et al. Determination of anatomic landmarks for optimal placement in captive-bolt euthanasia of goats. *Am J Vet Res* 2018;79:276–281.)



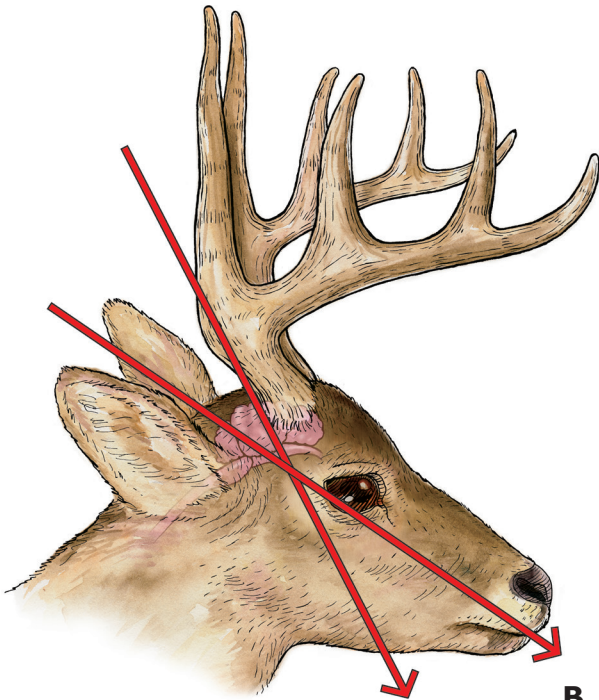
**Figure 15**—For horned sheep or goats (A), place the PCB perpendicular to the skull over the anatomic site identified as slightly caudal to the poll (also known as the crown or the highest point on the head) at the intersection of 2 lines drawn from the outside corner of each eye to the middle of the base of the opposite ear. (Plummer PJ, Shearer JK, Kleinhenz KE, et al. Determination of anatomic landmarks for optimal placement in captive-bolt euthanasia of goats. *Am J Vet Res* 2018;79:276–281.) Alternatively, a site located on the dorsal midline of the head, which corresponds with the external occipital protuberance of the skull, may be used. When using the site associated with the external occipital protuberance, place the PCB flush with the skull at the external occipital protuberance while angling or aiming the muzzle of the PCB toward the mouth. (Collins SL, Caldwell M, Hecht S, et al. Comparison of penetrating and nonpenetrating captive bolt methods in horned goats. *Am J Vet Res* 2017;78:151–157.) Panel B indicates direction.



**Figure 16**—Anatomic site for placement of a captive bolt and desired path of the projectile in camelids. The device should be placed at the crown position (highest point on the head) aiming downward to the base of the jaw.



**A**

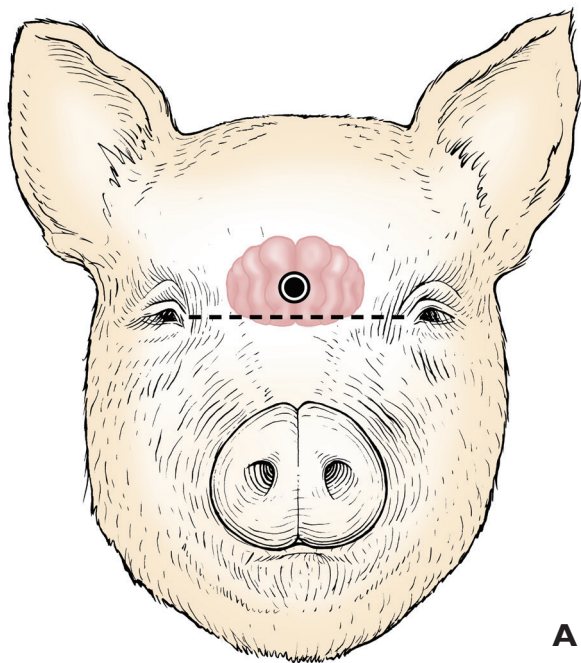


**B**

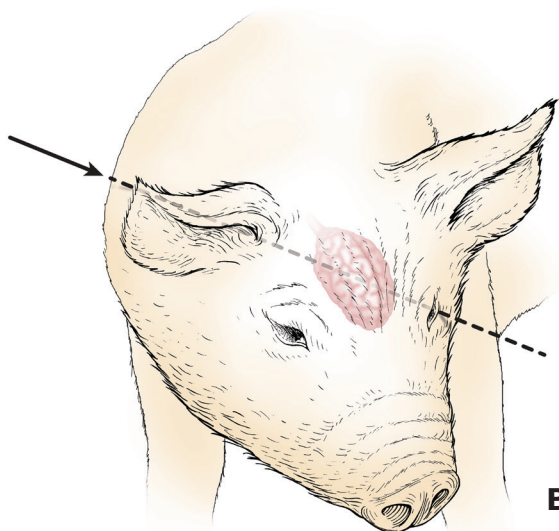
**Figure 17**—Anatomic site for placement of a captive bolt and desired path of the projectile in antlered deer. A captive bolt device with a longer bolt may be needed. The point of entry of the projectile should be at the intersection of 2 imaginary lines drawn from the outside corner of each eye to the top of the base of the ear or base of the antler (A). Alternatively, a site located on the dorsal midline of the head, which corresponds with the external occipital protuberance of the skull, may be used. When using the site associated with the external occipital protuberance, place the PCB flush with the skull at the external occipital protuberance while angling or aiming the muzzle of the PCB toward the mouth. Panel B indicates direction.



**Figure 18**—Anatomic site for placement of a captive bolt in neonatal lambs and kids. The preferred shooting position is with the muzzle of the NPCB on the midline behind the poll (ie, between the ears) with the chin tucked into the neck. (Grist A, Lines JA, Knowles TG, et al. The use of a mechanical non-penetrating captive bolt device for the euthanasia of neonate lambs. *Animals (Basel)* 2018;8:49. Sutherland MA, Watson TJ, Johnson CB, et al. Evaluation of the efficacy of a non-penetrating captive bolt to euthanase neonatal goats up to 48 hours of age. *Anim Welf* 2016;25:471–479. Grist A, Lines JA, Knowles TG, et al. Use of a non-penetrating captive bolt for euthanasia of neonate goats. *Animals (Basel)* 2018;8:58.)

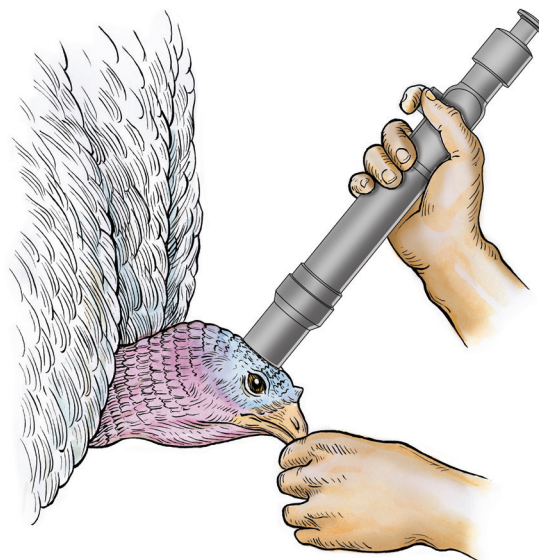


A



B

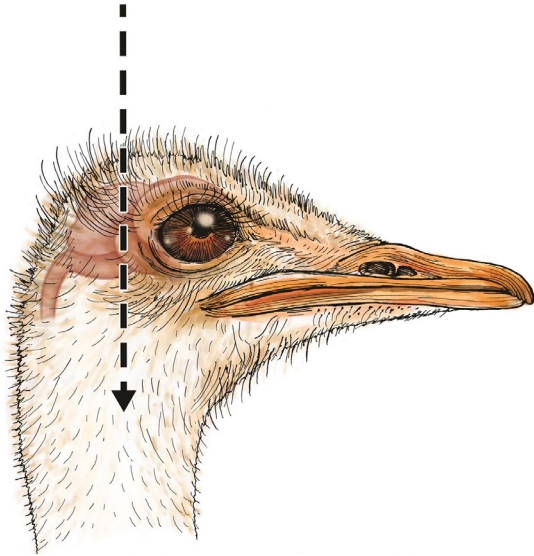
**Figure 19**—Shown is 1 possible anatomic site for PCB and 2 possible anatomic sites for gunshot application in swine. The frontal site may be used for both PCB and gunshot (A) and is located in the center of the forehead slightly above a line drawn between the eyes. The bolt or bullet should be directed toward the spinal canal. The behind-the-ear site (B) should be used only with gunshot application, and the projectile should be toward the opposite eye. The ideal target location and direction of aim may vary slightly according to the breed and age of the animal (owing to growth of the frontal sinuses).



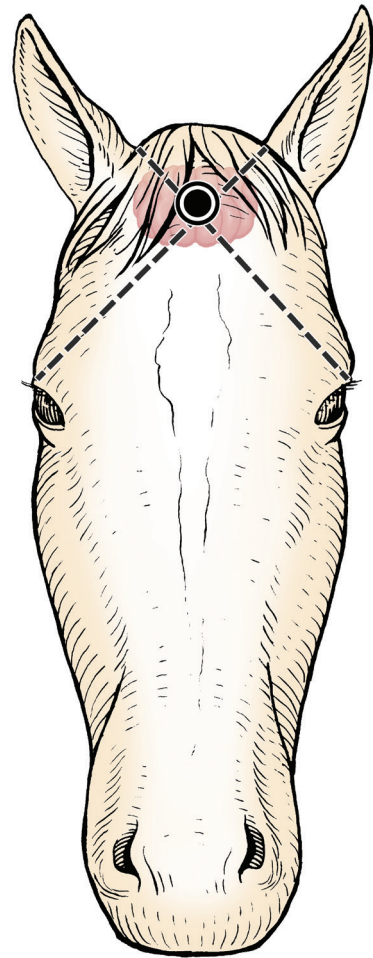
**Figure 20**—Anatomic site for placement of a captive bolt in turkeys (and poultry that lack comb development). The placement of the device should be directly on the midline of the skull and at the highest/widest point of the head with the captive bolt aimed directly down toward the brain. To ensure accurate captive bolt placement and to optimize the safety of the operator, the bird must be correctly restrained. In this illustration, the tip of the beak is held to enable the operator to safely and securely restrain the head of the bird while positioning the captive bolt with the other hand. An additional person is required to restrain the wings and/or feet of the bird (ideally the breast of the bird should rest on a solid surface to keep the bird calm) during and after the application of the captive bolt.



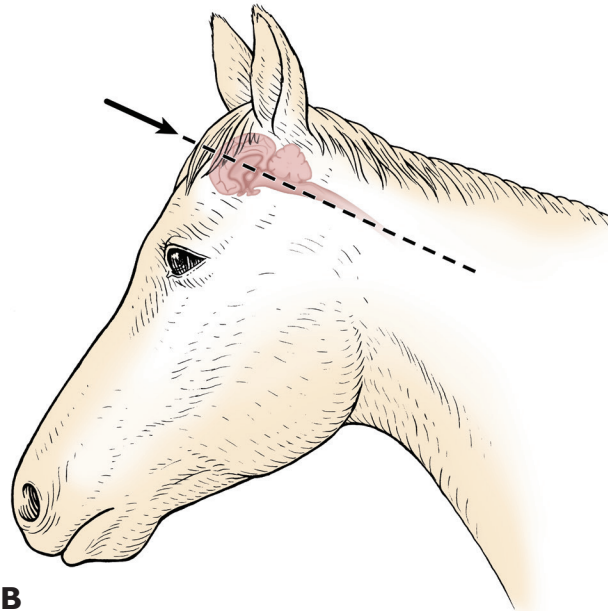
**Figure 21**—Anatomic site for placement of a captive bolt in chickens (and poultry with comb development). The placement should be directly behind the comb and on the midline of the skull with the captive bolt aimed directly down. To ensure accurate captive bolt placement and to optimize the safety of the operator, the bird must be correctly restrained. In this illustration, the comb of the bird is held to enable the operator to safely and securely restrain the head of the bird while positioning the captive bolt with the other hand. To provide additional restraint and resistance against the captive bolt strike force, the ventral portion of the bird's head should be placed against a flat surface (eg, floor or board) to ensure optimal concussion from the device.



**Figure 22**—Anatomic site for placement of a captive bolt and desired path of the projectile in ratites. A captive bolt device with either an NPCB or a short penetrating bolt and the smallest charge appropriate for poultry or rabbits should be applied to the top of the head at the midpoint of an imaginary line between the outer “ear” openings.

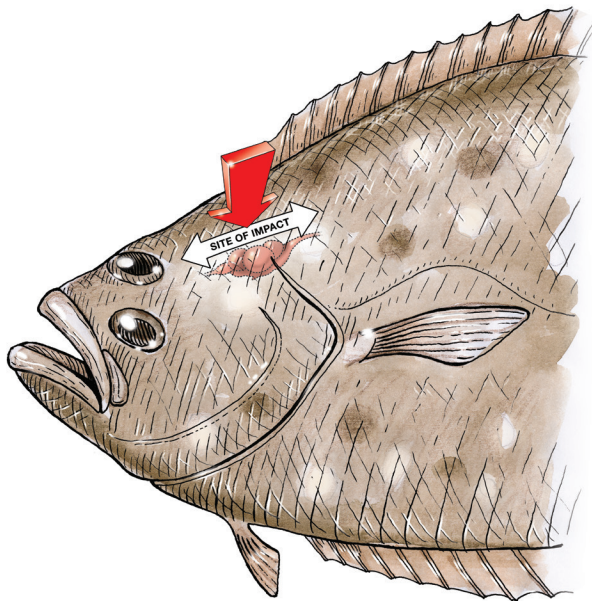


**A**

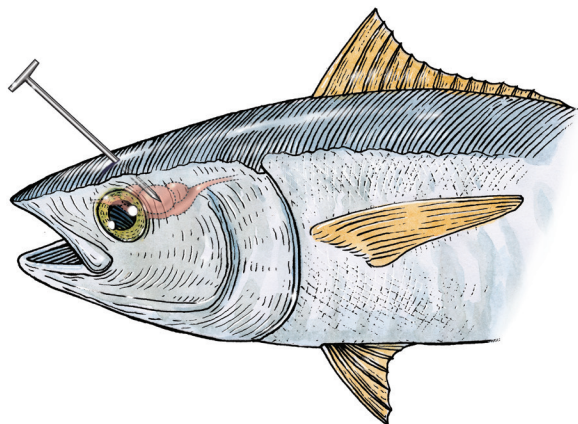


**B**

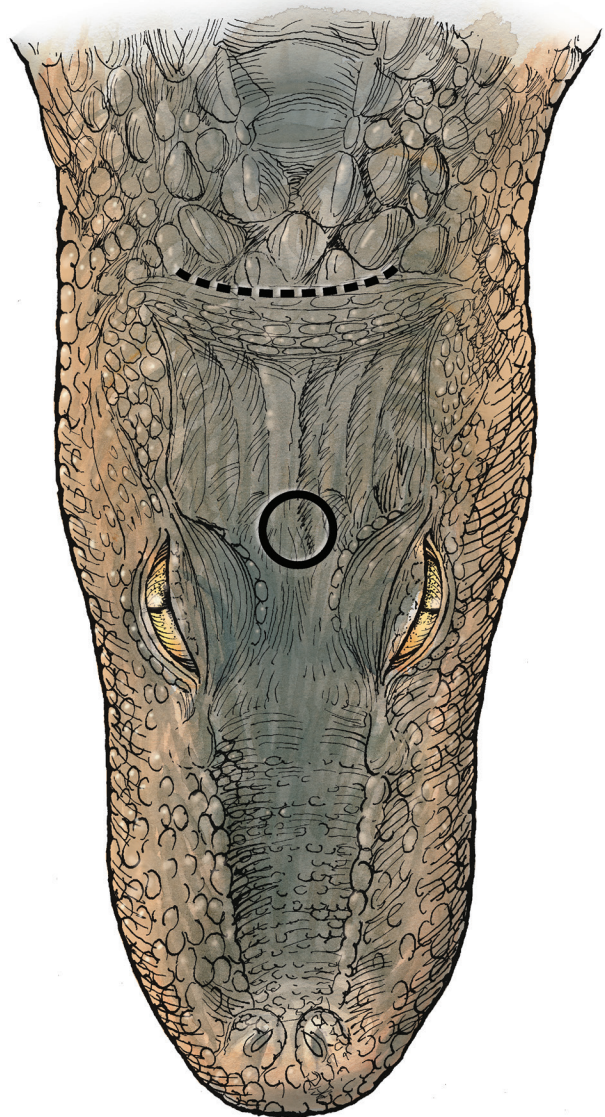
**Figure 23**—Anatomic site for the application of gunshot or PCB for euthanasia of equids (A). The point of entry of the projectile should be at the intersection of 2 imaginary lines, each drawn from the outside corner of the eye to the center of the base of the opposite ear. Panel B indicates direction.



**Figure 24**—Anatomic site for the application of manually applied blunt force trauma in finfish. The finfish’s size, species, and anatomy and the characteristics of the blow (including its accuracy, speed, and club mass) will determine the efficacy of manually applied blunt force trauma. The location of the blow should be targeted at the area where the brain is closest to the surface of the head and where the skull is its thinnest.



**Figure 25**—Anatomic sites for captive bolt of large fish species. The NPCB gun has either a wide mushroom-shaped head or a flat head that does not penetrate the brain. With PCB devices (including spiking), the projectile should be directed into the hindbrain of the fish; there should be a focus on maximum destruction of brain tissue.



**Figure 26**—Anatomic sites for captive bolt or gunshot placement and for spinal cord severance or decapitation. The brain of the alligator is relatively small and is located immediately behind orbits and extends caudally between the supratemporal fossae. To ensure destruction of brain tissue, the captive bolt or gunshot must be placed on the midline between the orbit and the cranial aspect of the supratemporal fossae.

## **SVO Government Operated Animal Pounds/Shelters Guidance**

Created By Authority Granted in A.R.S. 3-1213 and A.R.S. 11-1021

Last Edited 2012-05-22

Don Butler, Director, Arizona Department of Agriculture

Perry J. Durham, DVM, State Veterinarian

### **Acronyms Used**

AAC = Arizona Administrative Code

AVMA = American Veterinary Medical Association

AZ = Arizona

CPO = Certified Peace Officer

CS = controlled substances as defined by DEA

DEA = Drug Enforcement Administration

DVM = veterinarian licensed in AZ

GB = Governing Body

GOAPS = government operated animal pound and/or shelter

IP = intraperitoneal

IPI = intraperitoneal injection

MOU = Memorandum of Understanding

NACA = National Animal Control Association

OHE = ovario-hysterectomy

POST = Peace Officer Standards and Training Board

RP = Responsible Person

SV = State Veterinarian

SVO = State Veterinarian's Office

VMEB = Veterinary Medical Examining Board

### **Applicability**

This guidance applies only to those GOAPS which do not have DVM on staff as written in A.R.S. 3-1213.

### **Construction**

This policy consists of four (4) distinct parts

- Part 1 defines the procedures involved for obtaining the controlled substances required for euthanasia.
- Part 2 defines the training required of GOAPS staff who will be performing euthanasia.
- Part 3 defines the actual procedures involved with performing euthanasia.
- Part 4 consists of the MOU agreed to by both the SV and the GB.

#### **Part One: Drug Acquisition & Handling**

Statute references T-61 and sodium pentobarbital specifically. However, T-61 was voluntarily withdrawn from the market by its manufacturer circa 1991. Statute also includes the clause, "or its generic equivalent." Sodium pentobarbital is a barbituric acid derivative. It and other barbiturates are approved by FDA as euthanasia agents and are generally commercially available.

The drug/s involved with euthanasia are controlled substances regulated by the Federal DEA. The normal procedure for obtaining these drugs in veterinary practice is via a DVM who holds a DEA License. The drugs are then used under the direct supervision of DVM.

In lieu of the above procedure involving DVM, the DEA branch in Phoenix will issue an *Animal Shelter Registration* to the GOAPS facility after SV is satisfied operational requirements have been met by GOAPS and agreement has been signed (in addition to this guidance, see GOAPS Agreement.)



This arrangement does not alleviate GB from inventory tracking mandates of these drugs. CS must be handled in accordance with AAC R3-11-502(I), R3-11-502(J), R3-11-502(K)(2), R3-11-502(K)(3), and R3-11-805 with the exception of the term DVM. See [DEA Registrants Obligations](#) for detailed recommendations and sample forms.

### Part Two: Training

Adequately trained staff is a necessity.

Prior to any GOAPS staff member performing euthanasia, proof of adequate training must be presented to GB or its GOAPS management and documentation of such must be retained by GOAPS.

Training will be considered adequate if proof of any of the following exists.

1. certified veterinary technician license in good standing in state issued
2. certificate of satisfactory completion of NACA Euthanasia Workshop
3. certificate of satisfactory completion of other euthanasia training which meets prior approval of SV<sup>1</sup>

### Part Three: Euthanasia Procedure

The AVMA Guidelines on Euthanasia provide the basis for the procedures to be followed. (see appendix for reference)

- Barbiturates induce euthanasia smoothly, with minimal discomfort to the animal
- Intravenous injection is necessary to deliver the drug in time and quantity necessary
  - follow label directions
- Intravenous injection requires trained personnel
- Each animal must be restrained, again requiring trained personnel
- Strict accounting for CS; and these must be used under the authority of RP and under the supervision of GOAPS management
- Intraperitoneal (IP) injection (IPI) may be used in situations when an intravenous injection would be distressful or even dangerous.
  - IPI requires prior GOAPS managerial approval
- Intracardiac injection must only be used if the animal is heavily sedated, unconscious, or in a deep plane of anesthesia
- Prenatal and Neonatal Situations
  - When OHE (spays) are performed, euthanasia of feti should be accomplished as soon as possible after removal from the dam.
  - Neonates are relatively resistant to hypoxia. Suffocation is NOT an acceptable method of euthanasia.
- Other Points to Note
  - Terminal gasp may occur in unconscious animals
  - CS persist in the carcass and may cause sedation or even death of animals, including humans, that consume the body of an animal euthanized with barbiturates

### Part Four: Agreement

see [GOAPS Agreement](#)

### Appendix

A.R.S. 3-1213. Acquisition and use of sodium pentobarbital or T-61 euthanasia solution by county and local pounds - <http://www.azleg.gov/FormatDocument....=3&DocType=ARS>

A.R.S. 11-1021. Proper care, maintenance and destruction of impounded animals - <http://www.azleg.gov/FormatDocument....11&DocType=ARS>

A.A.C. 3 Chap 11 Art.5: Standards of Practice - [http://www.azsos.gov/public\\_services....htm#Article\\_5](http://www.azsos.gov/public_services....htm#Article_5)

A.A.C. 3 Chap 11 Art.8: Drug Dispensing - [http://www.azsos.gov/public\\_services....htm#Article\\_8](http://www.azsos.gov/public_services....htm#Article_8)

<http://www.nacenet.org>

<http://www.nacenet.org/training.html>

<http://www.nacenet.org/euthanasia.html>

[http://www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf)

**Footnotes**

<sup>1</sup>Other euthanasia training will be considered on a case-by-case basis for approval by SV

**STATE BOARD OF ACCOUNTANCY**

Title 4, Chapter 1

**Amend:** R4-1-229, R4-1-341, R4-1-453, R4-1-454, R4-1-455



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - REGULAR RULEMAKING

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 12, 2023

**SUBJECT:** ARIZONA STATE BOARD OF ACCOUNTANCY  
Title 4, Chapter 1

**Amend:** R4-1-229, R4-1-341, R4-1-453, R4-1-454, R4-1-455

---

### **Summary:**

This regular rulemaking from the Arizona State Board of Accountancy (Board) seeks to amend five (5) rules in Title 4, Chapter 1, Articles 2, 3, and 4 related to CPA Examination, Certification and Registration, and Regulation respectively. Specifically, the Board indicates the proposed rule changes would accomplish the following:

- Provide candidates for the Uniform CPA Examination (Exam) more flexibility by clarifying that their conditioned credit is valid for 18 months from the score release date, rather than the examination date. Additionally, extending Exam credits for candidates during a transition period due to changes in the Exam.
- Remove a certification requirement that applicants submit a signed and dated letter of recommendation due to the recent removal of "good moral character" from A.R.S. § 32-721 due to Laws 2022, Chapter 59, HB 2612.
- Conform rule R4-1-453 to use a more intuitive term "self-study" program, in lieu of "correspondence" program.
- Update incorporations by reference in rules R1-5-454 and R1-4-455.

1. **Are the rules legal, consistent with legislative intent, and within the agency's statutory authority?**

The Board cites both general and specific statutory authority for these rules.

2. **Do the rules establish a new fee or contain a fee increase?**

This rulemaking does not establish a new fee or contain a fee increase.

3. **Does the preamble disclose a reference to any study relevant to the rules that the agency reviewed and either did or did not rely upon?**

The Board indicates it did not review or rely on a study in its evaluation of or justification for a rule in this rulemaking.

4. **Summary of the agency's economic impact analysis:**

The Uniform Certified Public Accountant (CPA) Examination (Exam) is in the process of evolving via the CPA Evolution initiative, a joint effort between the National Association of State Boards of Accountancy (NASBA) and the American Institute of Certified Public Accountants (AICPA) which will result in a new Exam on January 1, 2024. The Board provides the following summary of the economic impacts of changes to the rules:

- Amendments to R4-1-229 are expected to positively benefit the Board and Exam candidates by implementing a transition policy that is easy to understand, communicate, and implement.
- Amendments to R4-1-341 are expected to positively affect applicants as the change in rule will clarify that a letter of recommendation is no longer required.
- Amendments to R4-1-453 are expected to positively affect the Board and its regulated community by clarification to the Board's continuing education rule.
- Amendments to R4-1-454 and R4-1-455 are expected to affect the Board, consumers, and the regulated community in that the Board will be able to hold registrants accountable to the most current versions of the peer review standards and the AICPA's Code of Professional Conduct, which directly ties to the Board's mission to protect health.

5. **Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Board believes that the changes are the least costly and least intrusive methods and that most changes are either technical, conforming, or directly benefit the applicant.

6. **What are the economic impacts on stakeholders?**

The Board is the only state agency directly affected by the rulemaking. The Board will benefit from being able to implement an effective transition policy that is easy to understand,

communicate and implement. No political subdivisions are directly affected by the rule. Amendments to this rule are expected to positively benefit the Board, Exam candidates, the AICPA, and NASBA. The AICPA and the NASBA would benefit from the Board's implementation of this transition policy as it would move them one step closer to ensuring a nationally consistent transition policy for all Exam candidates. The change is expected to minimize any confusion applicants may have had if they consulted the rule to understand certification requirements. The Board expects this rulemaking to have no impact on private or public employment.

**7. Are the final rules a substantial change, considered as a whole, from the proposed rules and any supplemental proposals?**

The Board indicates there were no changes made between the Notice of Proposed Rulemaking published in the Administrative Register on December 2, 2022 and the Notice of Final Rulemaking now before the Council.

**8. Does the agency adequately address the comments on the proposed rules and any supplemental proposals?**

The Board indicates it received no comments related to this rulemaking and no one attended the oral proceeding held on January 9, 2023.

**9. Do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Board indicates the rules do not require a permit, license, or agency authorization.

**10. Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

Not applicable. The Board indicates there are no corresponding federal laws regarding CPAs or any other subjects of the rules.

**11. Conclusion**

This regular rulemaking from the Board seeks to amend five (5) rules in Title 4, Chapter 1, Articles 2, 3, and 4 related to CPA Examination, Certification and Registration, and Regulation respectively. Specifically, the Board seeks to amend the rules to clarify that conditioned credit is valid for 18 months from the score release date, rather than the examination date, remove a certification requirement that applicants submit a signed and dated letter of recommendation due to the recent removal of "good moral character" from A.R.S. § 32-721 due to Laws 2022, Chapter 59, HB 2612, conform rule R4-1-453 to use a more intuitive term "self-study" program, in lieu of "correspondence" program, and update incorporations by reference in rules R1-5-454 and R1-4-455.

The Board is seeking the standard 60-day delayed effective date pursuant to A.R.S. § 41-1032(A). Council staff recommends approval of this rulemaking.



# ARIZONA STATE BOARD OF ACCOUNTANCY

100 N. 15<sup>th</sup> Ave., Suite 165  
Phoenix, AZ 85007  
(602) 364-0804  
Fax (602) 364-0903  
info@azaccountancy.gov

February 21, 2023

The Governor's Regulatory Review Council  
100 North 15th Avenue, Ste. 302  
Phoenix, AZ 85007

**Re: Request for Approval - Notice of Final Rulemaking**

Council Members:

I am pleased to submit the Notice of Final Rulemaking on behalf of the Arizona Board of Accountancy. Pursuant to A.A.C. R1-6-201(A)(1), I have addressed the following:

- a. **The close of record date** – January 9, 2023
- b. **Whether the rulemaking activity relates to a five-year rule review report and, if applicable, the date the report was approved by Council** – This rulemaking does not relate to a five-year rule review report.
- c. **Whether the rule establishes a new fee and, if it does, citation of the statute expressly authorizing the new fee** – The rules do not establish a new fee.
- d. **Whether the rule contains a fee increase** – The rules do not contain a fee increase.
- e. **Whether an immediate effective date is requested under A.R.S. §41-1032** – An immediate effective date is not being requested.
- f. **A certification that the preamble discloses a reference to any study relevant to the rules that the agency reviewed and either did or did not rely on in the agency's evaluation or justification for the rule** – I certify that the Board did not review or rely on any study for this rulemaking.
- g. **If one or more full time employees are necessary to implement and enforce the rule, a certification that the preparer of the economic, small business, and consumer impact statement has notified the JLBC of the number of new full-time employees necessary to implement and enforce the rule** – No new FTEs are required to enforce the rules in the Notice of Final Rulemaking.
- h. **A list of all the documents enclosed** – Written requests for exemption from rulemaking moratorium and approvals, Notice of Final Rulemaking (including preamble); text of rules;

**The Americans with Disabilities Act**

Persons with disabilities may request reasonable accommodations, such as sign language interpreters. Requests should be made as early as possible to allow time to arrange the accommodation.



economic, small business, and consumer impact statement; material incorporated by reference; and general and specific statutes authorizing the rules.

Thank you for your consideration and approval of the Board's Notice of Final Rulemaking.

Sincerely,

A handwritten signature in blue ink, appearing to read "Monica L. Petersen", with a long horizontal flourish extending to the right.

Monica L. Petersen  
Executive Director

NOTICE OF FINAL RULEMAKING  
TITLE 4. PROFESSIONS AND OCCUPATIONS  
CHAPTER 1. BOARD OF ACCOUNTANCY

PREAMBLE

<u>1. Article, Part, or Section Affected (as applicable)</u>	<u>Rulemaking Action</u>
R4-1-229	Amend
R4-1-341	Amend
R4-1-453	Amend
R4-1-454	Amend
R4-1-455	Amend

**2. Citations to the agency’s statutory rulemaking authority to include both the authorizing statute (general) and the implementing statute (specific):**

Authorizing statute: A.R.S. § 32-703(B)(7) and (13)

Implementing statute: A.R.S. § 32-703(B)(8)

**3. The effective date of the rule:**

The agency accepts the standard effective date of 60 days as specified in A.R.S. § 41-1032(A).

**a. If the agency selected a date earlier than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the earlier date and state the reason or reasons the agency selected the earlier effective date as provided in A.R.S. § 41-1032(A)(1) through (5):**

Not applicable.

**b. If the agency selected a date later than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the later date and state the reason or reasons the agency selected the later effective date as provided in A.R.S. § 41-1032(B):**

Not applicable.

**4. Citations to all related notices published in the *Register* as specified in R1-1-409(A) that pertain to the record of the final rulemaking package:**

Notice of Rulemaking Docket Opening: 28 A.A.R. 3721, December 2, 2022

Notice of Proposed Rulemaking: 28 A.A.R. 3659, December 2, 2022

**5. The agency’s contact person who can answer questions about the rulemaking:**

Name: Monica L. Petersen, Executive Director  
Address: Board of Accountancy, 100 N. 15<sup>th</sup> Ave., Suite 165, Phoenix, AZ 85007  
Telephone: (602) 364-0870  
Fax: (602) 364-0903  
E-mail: mpetersen@azaccountancy.gov  
Website: [www.azaccountancy.gov](http://www.azaccountancy.gov)

**6. An agency’s justification and reason why a rule should be made, amended, repealed or renumbered, to include an explanation about the rulemaking:**

R4-1-229. Subsections (A) and (B) are modified to state that a conditioned credit is valid for 18 months from the score release date in lieu of an examination date. This is a pro-applicant change because it provides additional time for Uniform Certified Public Accountant (CPA) Examination (Exam) candidates.

Subsection (C) is modified to allow any candidate with Exam credit(s) on January 1, 2024, to have such credit(s) extended to June 30, 2025. The Exam is in the process of evolving via the CPA Evolution initiative, a joint effort between the National Association of State Boards of Accountancy (NASBA) and the American Institute of Certified Public Accountants (AICPA) which will result in a new Exam on January 1, 2024. CPA Evolution seeks to transform the CPA licensure model to recognize the rapidly changing skills and competencies the practice of accounting requires today and will require in the future. Upon the launch of the new Exam in January 2024, it is anticipated some candidates with conditional credit may possibly be negatively impacted by fewer opportunities to test and delays in score reporting. Changes to subsection (C) will implement a nationally recommended transition policy, which will benefit those seeking to pass the Exam during this transition period.

R4-1-341. Effective September 24, 2022, Laws 2022, Chapter 59 (HB 2612) removed “good moral character” as a certification requirement for CPAs in A.R.S. § 32-721. Prior to this removal, applicants had to demonstrate good moral character and such evidence was obtained, in part, via a letter of recommendation from a CPA or an individual who has accounting education and experience similar to that of a CPA (A.A.C. R4-1-341(A)(2)(c)). As there is no longer a statutory requirement for applicants to demonstrate good moral character, there is no longer a need to require that applicants submit a letter of recommendation.

R4-1-453. “Correspondence” program is an archaic term to describe continuing professional education (CPE) courses that are not live and are taken at the CPA’s own time and pace. While the term has been historically used in the Board’s rules, it is now outdated. “Self-study” is more commonly used with CPE courses and clarifying A.A.C. R4-1-453 to use this more modern term should reduce any confusion that CPAs may have.

R4-1-454 and R4-1-455. The Board seeks to update the incorporations by reference found in A.A.C. R4-1-454 and R4-1-455. A.R.S. § 41-1028(B) requires that a reference in rule fully identify an incorporated matter by location, date and state that the rule does not include any later amendments or editions of the incorporated matter.

**7. A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

The Board did not review or rely on a study in its evaluation of or justification for a rule in this rulemaking.

**8. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable.

**9. A summary of the economic, small business, and consumer impact:**

Amendments to R4-1-229 are expected to positively affect the Board and Exam candidates. The Board will benefit from being able to implement an effective transition policy that is easy to understand, communicate, and implement. Exam candidates will benefit from a transition policy that minimizes candidate disruption and impact to the candidate pipeline. The credit extension may also financially benefit some Exam candidates by removing the need to re-apply for the Exam should their credit have normally expired.

Amendments to R4-1-341 are expected to positively affect applicants as the change will clarify in rule that a letter of recommendation is no longer required. The Board will benefit from eliminating any possible confusion that applicants may have had if they consulted the rule to understand requirements and conforming its rule to Laws 2022, Chapter 59 (HB 2612).

Amendments to R4-1-453 are expected to positively affect the Board and its regulated community. The Board will benefit from having a clearer rule, which will benefit the regulated community when they review the Board’s continuing professional education rule.

Amendments to R4-1-454 and R4-1-455 are expected to affect the Board, consumers, and the regulated community. The Board will benefit from being able to hold registrants accountable to the most current versions of the peer review standards and the AICPA's Code of Professional Conduct, which directly ties to the Board's mission to protect the public. As this update will assist the Board in better fulfilling its mission, the public will also benefit from the more effective protection. Lastly, the regulated community will be affected by being held accountable to these more current standards.

**10. A description of any changes between the proposed rulemaking, to include supplemental notices, and the final rulemaking:**

No changes were made.

**11. An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments:**

No comments were received regarding the Notice of Proposed Rulemaking. No one presented oral or written comments at the oral proceeding held on January 9, 2023. The record closed at 5:00 p.m. on January 9, 2023.

**12. All agencies shall list other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:**

**a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:**

The rules do not require a permit.

**b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:**

There is no federal law regarding CPAs or any other subjects of the rules.

**c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:**

No analysis was submitted.

**13. A list of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rule:**

R4-1-454(A) – Standards for Performing and Reporting on Peer Reviews

<https://www.aicpa.org/content/dam/aicpa/research/standards/peerreview/downloadabledocuments/peerreviewstandards.pdf>

R4-1-455(A) – Code of Professional Conduct

<https://pub.aicpa.org/codeofconduct/ethicsresources/et-cod.pdf>

**14. Whether the rule was previously made, amended or repealed as an emergency rule. If so, cite the notice published in the *Register* as specified in R1-1-409(A). Also, the agency shall state where the text was changed between the emergency and the final rulemaking packages:**

No rule in this rulemaking was previously made, amended, or repealed as an emergency rule.

**15. The full text of the rules follows:**

**TITLE 4. PROFESSIONS AND OCCUPATIONS**  
**CHAPTER 1. BOARD OF ACCOUNTANCY**

**ARTICLE 2. CPA EXAMINATION**

R4-1-229. Conditioned Credit

**ARTICLE 3. CERTIFICATION AND REGISTRATION**

R4-1-341. CPA Certificates; Firm Registration; Reinstatement; Reactivation

**ARTICLE 4. REGULATION**

R4-1-453. Continuing Professional Education

R4-1-454. Peer Review

R4-1-455. Professional Conduct and Standards

## Article 2 – CPA Examination

### R4-1-229. Conditioned Credit

- A. An applicant is allowed to sit for each section individually and in any order. An applicant is given conditioned credit for each section of the examination passed. A conditioned credit is valid for 18 months from the score release date of the examination. Upon written request to the Board and showing good cause, an applicant may be granted by the Board a 90-day extension to a conditioned credit.
- B. Transfer of conditioned credit. The Board shall give an applicant credit for all sections of an examination passed in another jurisdiction if the credit has been conditioned. If an applicant transfers conditioned credit from another jurisdiction, the applicant shall pass the remaining sections of the examination within the 18-month period from the score release date that the first section was passed. An applicant who fails to pass all sections of the Uniform CPA Examination within 18 months shall retake previously passed sections of the Uniform CPA Examination to ensure passage of all sections within an 18-month period.
- C. Any candidate with Uniform CPA Examination credit(s) on January 1, 2024 will have such credit(s) extended to June 30, 2025.

## Article 3 – Certification and Registration

### R4-1-341. CPA Certificates; Firm Registration; Reinstatement; Reactivation

- A. An applicant may apply for a certificate of certified public accountant or for reinstatement of a certificate by submitting:
  - 1. An application fee of \$100; and
  - 2. For an applicant applying for certification under A.R.S. § 32-721(A) and (B), a completed application including:
    - a. Verification that the applicant passed the Uniform CPA Examination,
    - b. Verification that the applicant meets the education and experience requirements specified in R4-1-343,
    - ~~c. One signed and dated letter of recommendation by a CPA or an individual who has accounting education and experience similar to that of a CPA,~~
    - d. Proof of a score of at least 90% on the American Institute of Certified Public Accountants (AICPA) examination in professional ethics taken within the two years immediately before the application is submitted,
    - e. Evidence of lawful presence in the United States, and
    - f. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  - 3. For an applicant applying for certification under A.R.S. § 32-721(A) and (C), a completed application including:
    - a. Verification that the applicant has passed the International Qualification Examination (IQEX),
    - b. License verification from each jurisdiction in which the applicant has ever been issued a certificate as a certified public accountant of which at least one must be an active certification from a jurisdiction with requirements determined by the Board to be substantially equivalent to the requirements in A.R.S. § 32-721(B) or verification that the applicant meets the education and experience requirements specified in R4-1-343,
    - c. Evidence of lawful presence in the United States, and
    - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  - 4. For an applicant applying for certification under A.R.S. § 32-721(A) and (D) for mutual recognition agreements adopted by the Board a completed application including:
    - a. Verification that the applicant has passed the International Qualification Examination (IQEX),



- b. License verification from the applicant's country which has a mutual recognition agreement with the National Association of State Boards of Accountancy that has been adopted by the Board,
  - c. Evidence of lawful presence in the United States, and
  - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
5. For an applicant applying for certification under A.R.S. § 32-4302, a completed application including:
    - a. License verification from each jurisdiction in which the applicant holds a license;
    - b. Evidence of lawful presence in the United States;
    - c. Proof of residency;
    - d. Disciplinary history, if applicable;
    - e. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  6. For an applicant applying for reinstatement from cancelled status under A.R.S. § 32-732(B) a completed application including:
    - a. CPE that meets the requirements of R4-1-453(C)(8) and (E), and
    - b. Evidence of lawful presence in the United States.
  7. For an applicant applying for reinstatement from expired, relinquished, or revoked status under A.R.S. § 32-732(C), a completed application including:
    - a. CPE that meets the requirements of R4-1-453(C)(8) and (E),
    - b. Evidence of lawful presence in the United States,
    - c. If not waived by the Board as part of a disciplinary order, evidence from an accredited institution or a college or university that maintains standards comparable to those of an accredited institution that the individual has completed at least one hundred fifty semester hours of education as follows:
      - i. At least 36 semester hours are accounting courses of which at least 30 semester hours are upper level courses.
      - ii. At least 30 semester hours are related courses.
    - d. If prescribed by the Board as part of a disciplinary order, evidence that the individual has retaken and passed the Uniform Certified Public Accountant Examination.
- B. An applicant may apply for a certified public accountant firm registration or for reinstatement of a registration by submitting:**
1. For an applicant applying for a new firm under A.R.S. § 32-731, a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited liability companies, confirmation of business name on the Secretary of State's website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
    - b. If applicable, peer review results as prescribed by R4-1-454(A); and
    - c. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  2. For an applicant applying for reinstatement from cancelled under A.R.S. § 32-732(E) a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited liability companies, confirmation of business name on the Secretary of State's website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
    - b. If applicable, peer review results as prescribed by R4-1-454(A); and
    - c. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  3. For an applicant applying for reinstatement from expired, relinquished, or revoked status under A.R.S. § 32-732(F) a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited liability companies,

- confirmation of business name on the Secretary of State’s website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
  - b. If applicable, peer review results as prescribed by R4-1-454(A);
  - c. If applicable, substantial evidence that the applicant has been completely rehabilitated with respect to the conduct that was the basis of the expiration, relinquishment or revocation of the firm’s registration; and
  - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
- C. Pursuant to Title 41, Chapter 6, Article 7.1, the Board’s licensing time frames are as follows:
1. Certification/Reinstatement/Reactivation
    - a. Administrative Completeness Review Time Frame. The Board shall notify the applicant within 30 days from the receipt of the application that the application is complete.
      - i. If the application is incomplete, an incomplete notice shall specify what information is missing. If the Board issues an incomplete notice, the administrative completeness review time frame and the overall time frame are suspended from the date the notice is issued until the date the Board receives the missing information from the applicant.
      - ii. The applicant has 30 days from the date of the incomplete notice to respond in writing and provide all the missing information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (A).
    - b. Substantive Review Time Frame. The Board has 60 days to complete its substantive review.
      - i. If the Board finds deficiencies during the substantive review of the application, the Board may issue one comprehensive written request to the applicant for additional information. If the Board issues a comprehensive written request, or a supplemental request by mutual agreement, the substantive review time frame and the overall time frame are suspended from the date the request is issued until the date the Board receives the additional information from the applicant.
      - ii. The applicant has 30 days from the date of the written request to respond in writing and provide all the additional information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (A).
    - c. Overall Time Frame. The Board has 150 days to issue a written notice to an applicant approving or denying an application.
  2. Firm Registration
    - a. Administrative Completeness Review Time Frame. The Board shall notify the applicant within 10 days from the receipt of the application that the application is complete.
      - i. If the application is incomplete, an incomplete notice shall specify what information is missing. If the Board issues an incomplete notice, the administrative completeness time frame and the overall time frame are suspended from the date the notice issued until the date the Board receives the missing information from the applicant.
      - ii. The applicant has 30 days from the date of the incomplete notice to respond in writing and provide all the missing information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (B).
    - b. Substantive Review Time Frame. The Board has 60 days to complete its substantive review.
      - i. If the Board finds deficiencies during the substantive review of the application, the Board may issue one comprehensive written request to the applicant for additional information. If the Board issues a comprehensive written request, or a supplemental request by mutual agreement, the substantive time frame and the overall time frame are suspended from the date the request is issued until the date the Board receives the additional information from the applicant.
      - ii. The applicant has 30 days from the date of the written request to respond in writing and provide all the additional information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (B).

- c. Overall Time Frame. The Board has 90 days to issue a written notice to an applicant approving or denying an application.
- D. If the Board denies an applicant's request under this section, the Board shall send the applicant written notice explaining:
  - 1. The reason for denial, with citations to supporting statutes or rules;
  - 2. The applicant's right to seek a fair hearing to challenge the denial; and
  - 3. The time periods for appealing the denial.
- E. The Board shall send the applicant any written notice required by this section in accordance with R4-1-117(E)(1) or (2).

#### **Article 4 – Regulation**

##### **R4-1-453. Continuing Professional Education**

- A. Measurement Standards. The Board shall use the following standards to measure the hours of credit given for CPE programs completed by an individual registrant.
  - 1. CPE credit shall be given in one-fifth or one-half increments for periods of not less than one class hour except as noted in paragraph 8. The computation of CPE credit shall be measured as follows:
    - a. A class hour shall consist of a minimum of 50 continuous minutes of instruction
    - b. A half-class hour shall consist of a minimum of 25 continuous minutes of instruction
    - c. A one-fifth class hour shall consist of a minimum of 10 continuous minutes of instruction.
  - 2. Courses taken at colleges and universities apply toward the CPE requirement as follows:
    - a. Each semester - system credit hour is worth 15 CPE credit hours,
    - b. Each quarter - system credit hour is worth 10 CPE credit hours, and
    - c. Each noncredit class hour is worth one CPE credit hour.
  - 3. Each ~~correspondence~~ self-study program hour is worth one CPE credit hour.
  - 4. Acting as a lecturer or discussion leader in a CPE program, including college courses, may be counted as CPE credit. The Board shall determine the amount of credit on the basis of actual presentation hours, and shall allow CPE credit for preparation time that is less than or equal to the presentation hours. A registrant may only claim as much preparation time as is actually spent for a presentation. Total credit earned under this subsection for service as a lecturer or discussion leader, including preparation time may not exceed 40 credit hours of the renewal period's requirement. Credit is limited to only one presentation of any seminar or course with no credit for repeat teaching of that course.
  - 5. The following may be counted for a maximum of 20 hours of CPE credit during each renewal period.
    - a. Credit may be earned for writing and publishing articles or books that contribute to the accounting profession and is published by a recognized third-party publisher of accounting material or a sponsor as long as it is not used in conjunction with a seminar.
    - b. Credit may be earned for the writing or development of online course curriculum for undergraduate, graduate, or doctoral education that contribute to the accounting profession.
    - c. Two credit hours will be given for each 3,000 words of original material written or developed into curriculum. Materials must be at least 3,000 words in length. Multiple authors may share credit for material written or developed into curriculum.
  - 6. A registrant may earn a combined maximum of 40 hours of CPE credit under subsections (A)(4) and (5) above during each renewal period.
  - 7. A registrant may earn a maximum of 20 hours of CPE during each renewal period by completing introductory computer-related courses. Computer-related courses may qualify as consulting services pursuant to subsection (C).
  - 8. A registrant may earn a maximum of 4 hours of CPE during each renewal period by completing nano-learning courses. A nano-learning program is a tutorial program designed to permit a participant to learn a given subject in a ten-minute time-frame through the use of electronic media and without interaction with a real time instructor.

9. CPE credit shall be given in one-fifth or one-half hour increments if the CPE is a segment of a continuing series related to a specific subject as long as the segments are connected by an overarching course that is a minimum of one hour and taken within the same CPE reporting period.
  10. Credit shall not be allowed for repeat participation in any seminar or course during the registration period.
- B. Programs that Qualify.** CPE credit may be given for a program that provides a formal course of learning at a professional level and contributes directly to the professional competence of participants.
1. The Board shall accept a CPE course as qualified if it:
    - a. Is developed by persons knowledgeable and experienced in the subject matter,
    - b. Provides written outlines or full text,
    - c. Is administered by an instructor or organization knowledgeable in the program, and
    - d. Uses teaching methods consistent with the study program.
  2. The Board shall accept a ~~correspondence~~ self-study program which includes online or computer based programs if the sponsors maintain written records of each student's participation and records of the program outline for three years following the conclusion of the program.
  3. An ethics program taught or developed by an employer or co-worker of a registrant does not qualify for the ethics requirements of subsection (C)(4).
- C. Hour Requirement.** As a prerequisite to registration pursuant to A.R.S. § 32-730(C) or to reactivate from inactive status pursuant to A.R.S. § 32-732(A), a registrant shall complete the CPE requirements during the two-year period immediately before registration or application respectively as specified under subsections (C)(1) through (C)(5). For registration periods of less than two years CPE may be prorated by quarter, with the exception of ethics.
1. A registrant whose last registration period was for two years shall complete 80 hours of CPE.
  2. A registrant shall complete a minimum of 40 hours in the subject areas of accounting, auditing, taxation, business law, or consulting services with a minimum of 16 hours in the subject areas of accounting, auditing, or taxation.
  3. A registrant shall complete a minimum of 16 of the required hours:
    - a. In a classroom setting,
    - b. Through an interactive live webinar, or
    - c. By acting as a lecturer or discussion leader in a CPE program, including college courses
  4. A registrant shall complete four hours of CPE in the subject area of ethics. The four hours required by this subsection shall include a minimum of one hour of each of the following subjects:
    - a. Ethics related to the practice of accounting including the Code of Professional Conduct of the American Institute of Certified Public Accountants, and
    - b. Board statutes and administrative rules.
  5. A registrant shall report, at a minimum, the CPE hours required for the registration period.
  6. CPE hours completed for a registration period may not be used for a subsequent registration period in any of the following instances:
    - a. To vacate a suspension for nonregistration,
    - b. To vacate a suspension for noncompliance with CPE requirements, or
    - c. To comply with a granted CPE extension.
  7. As a prerequisite to reactivate from retired status or reinstate from cancelled, expired, relinquished or revoked status, a registrant or an applicant shall complete up to 160 hours of CPE during the four-year period immediately before application to reactivate or reinstate. For periods of less than four years CPE may be prorated by quarter, with the exception of ethics.
    - a. A registrant or an applicant shall complete a minimum of 80 hours in the subject areas of accounting, auditing, taxation, business law, or consulting services with a minimum of 32 hours in the subject areas of accounting, auditing or taxation.
    - b. A registrant or an applicant shall complete a minimum of 32 hours of the required hours:
      - i. In a classroom setting,
      - ii. Through an interactive live webinar, or
      - iii. By acting as a lecturer or discussion leader in a CPE program, including college courses.

- c. A registrant or an applicant shall complete CPE in the subject area of ethics. Four hours of ethics CPE shall be required if 1 – 24 months have passed since the last registration due date for which CPE was completed. Eight hours of ethics CPE shall be required if 25 – 48 months have passed since the last registration due date for which CPE was completed. The hours required by this subsection shall include a minimum of one hour of each of the following subjects. The following subjects shall be completed during the two-year period immediately preceding application for reactivation or reinstatement:
  - i. Ethics related to the practice of accounting including the Code of Professional Conduct of the American Institute of Certified Public Accountants; and
  - ii. Board statutes and administrative rules.
- D. Reporting: A registrant or an applicant for reactivation or reinstatement, a registrant who is subject to an audit, or a registrant completing their registration must report the following details about their completed CPE:
  - 1. Sponsoring organization,
  - 2. Number of CPE credit hours,
  - 3. Title of program or description of content,
  - 4. Dates attended,
  - 5. Subject, and
  - 6. Method.
- E. In addition to the information required under subsection (D), a registrant or an applicant for reactivation or reinstatement from cancelled, expired, relinquished or revoked status, or a registrant subject to a CPE audit pursuant to subsection (G) shall provide the Board the following CPE records at its request: copies of transcripts, course outlines, and certificates of completion that include registrant’s name, course provider or sponsor, course title, credit hours, and date of completion.
- F. CPE Record Retention: A registrant shall maintain CPE records for three years from the date the registration was dated as received by the Board the following documents for all CPE completed for the registration period, even if not reported on the registration: transcripts, course outlines, and certificates of completion that include registrant’s name, course provider or sponsor, course title, credit hours, and date of completion.
- G. CPE audits: The Board, at its discretion, may conduct audits of a registrant’s CPE and require that the registrant provide the CPE records that the registrant is required to maintain under subsection (F) to verify compliance with CPE requirements.
- H. The Board may grant a full or partial exemption from CPE requirements on demonstration of good cause for a disability for only one registration period.
- I. A non-resident registrant seeking renewal of a certificate in this state shall be determined to have met the CPE requirements of this rule by meeting the CPE requirements for renewal of a certificate in the jurisdiction in which the registrant’s principal place of business is located.
  - 1. Non-resident applicants for renewal shall demonstrate compliance with the CPE renewal requirements of the jurisdiction in which the registrant’s principal place of business is located by signing a statement to that effect on the renewal application of this state.
  - 2. If a non-resident registrant’s principal place of business jurisdiction has no CPE requirements for renewal of a certificate or license, the non-resident registrant must comply with all CPE requirements for renewal of a certificate in this state.

**R4-1-454. Peer Review**

- A. Each firm, review team, and member of a review team shall comply with the Standards for Performing and Reporting on Peer Reviews, issued April 2019 and published June ~~15, 2021~~2022 in the AICPA Professional Standards by the American Institute of Certified Public Accountants, 220 Leigh Farm Road, Durham, North Carolina 27707-8110 (www.aicpa.org), which is incorporated by reference. This incorporation by reference does not include any later amendments or editions. The incorporated material is available for inspection and copying at the Board’s office.
- B. A firm must allow the sponsoring organization to make the following documents accessible to the Board via

the FSBA process:

1. Peer review report which has been accepted by the sponsoring organization,
  2. Firm's letter of response accepted by the sponsoring organization, if applicable,
  3. Completion letter from the sponsoring organization,
  4. Letter or letters accepting the documents signed by the firm with the understanding that the firm agrees to take any actions required by the sponsoring organization, if applicable, and
  5. Letter signed by the sponsoring organization notifying the firm that required actions have been appropriately completed, if applicable.
- C. Information discovered solely as a result of a peer review is not grounds for suspension or revocation of a certificate.
- D. Firms that reorganize a current firm, rename a firm, or create a new firm, within which at least one of the prior CPA owners remains an owner or employee, shall remain subject to the provisions of this Section. If a firm is merged, combined, dissolved, or separated, the sponsoring organization shall determine which resultant firm shall be considered the succeeding firm. The succeeding firm shall retain its peer review status and the review due date.

**R4-1-455. Professional Conduct and Standards**

- A. It is the Board's policy that the rules governing registrants be consistent with the rules governing the accounting profession generally. Except as otherwise set forth in these regulations, registrants shall conform their conduct to the Code of Professional Conduct, published June ~~15, 2021~~2022 in the AICPA Professional Standards by the American Institute of Certified Public Accountants, 220 Leigh Farm Road, Durham, North Carolina 27707-8110 ([www.aicpa.org](http://www.aicpa.org)), available from the AICPA.
- B. The AICPA Code of Professional Conduct, and any interpretations and ethical rulings by the issuing body, shall apply to all registrants, including those who are not members of the AICPA. The version specified above, including any interpretations and ethical rulings in effect shall apply. Any later amendments, additions, interpretations, or ethical rulings shall not apply.

# ECONOMIC, SMALL BUSINESS, AND CONSUMER IMPACT STATEMENT

## TITLE 4. PROFESSIONS AND OCCUPATIONS

### CHAPTER 1. BOARD OF ACCOUNTANCY

#### 1. Identification of the rulemaking:

R4-1-229. Subsections (A) and (B) are modified to state that a conditioned credit is valid for 18 months from the score release date in lieu of an examination date. This is a pro-applicant change because it provides additional time for Uniform Certified Public Accountant (CPA) Examination (Exam) candidates.

Subsection (C) is modified to allow any candidate with Exam credit(s) on January 1, 2024, to have such credit(s) extended to June 30, 2025. The Exam is in the process of evolving via the CPA Evolution initiative, a joint effort between the National Association of State Boards of Accountancy (NASBA) and the American Institute of Certified Public Accountants (AICPA) which will result in a new Exam on January 1, 2024. CPA Evolution seeks to transform the CPA licensure model to recognize the rapidly changing skills and competencies the practice of accounting requires today and will require in the future. Upon the launch of the new Exam in January 2024, it is anticipated some candidates with conditional credit may possibly be negatively impacted by fewer opportunities to test and delays in score reporting. Changes to subsection (C) will implement a nationally recommended transition policy, which will benefit those seeking to pass the Exam during this transition period.

R4-1-341. Effective September 24, 2022, Laws 2022, Chapter 59 (HB 2612) removed “good moral character” as a certification requirement for CPAs in A.R.S. § 32-721. Prior to this removal, applicants had to demonstrate good moral character and such evidence was obtained, in part, via a letter of recommendation from a CPA or an individual who has accounting education and experience similar to that of a CPA (A.A.C. R4-1-341(A)(2)(c)). As there is no longer a

statutory requirement for applicants to demonstrate good moral character, there is no longer a need to require that applicants submit a letter of recommendation.

R4-1-453. “Correspondence” program is an archaic term to describe continuing professional education (CPE) courses that are not live and are taken at the CPA’s own time and pace. While the term has been historically used in the Board’s rules, it is now outdated. “Self-study” is more commonly used with CPE courses and clarifying A.A.C. R4-1-453 to use this more modern term should reduce any confusion that CPAs may have.

R4-1-454 and R4-1-455. The Board seeks to update the incorporations by reference found in A.A.C. R4-1-454 and R4-1-455. A.R.S. § 41-1028(B) requires that a reference in rule fully identify an incorporated matter by location, date and state that the rule does not include any later amendments or editions of the incorporated matter.

- a. The conduct and its frequency of occurrence<sup>1</sup> that the rule is designed to change:

R4-1-229. As it relates to subsections (A) and (B), conditioned credits are currently valid for 18-months from the date of the examination. With the Exam being revised due to CPA Evolution, additional time will be required for the AICPA to grade and release the scores.

As it relates to subsection (C), the rule does not currently contain this nationally recommend transition policy language, which would assist candidates with conditional credit who may possibly be negatively impacted by fewer opportunities to test and delays in score reporting.

---

<sup>1</sup> A qualitative response is offered in lieu of quantitative data if it is not available or not applicable.



R4-1-341. While not currently enforced since the passage of Laws 2022, Ch.59, HB 2612, the rule requires that an applicant demonstrate good moral character via a letter of recommendation from a CPA or an individual who has accounting education and experience similar to that of a CPA (A.A.C. R4-1-341(A)(2)(c)). This requirement needs to be omitted from the rule, so the rule conforms with Laws 2022, Chapter 59 (HB 2612), which removed “good moral character” as a certification requirement for CPAs in A.R.S. § 32-721.

R4-1-453. The rule uses the archaic term “Correspondence” program, which is outdated.

R4-1-454 and R4-1-455. These two rules no longer incorporate by reference the most current versions of the peer review standards and the American Institute of Certified Public Accountants’ (AICPA) Code of Professional Conduct.

- b. The harm resulting from the conduct the rule is designed to change and the likelihood it will continue to occur if the rule is not changed:

R4-1-229. Failure to make the proposed changes in the rule’s subsections will disadvantage candidates who will need to wait longer for their scores to be released and will lose time in terms of their conditioned credit being valid.

R4-1-341. While the Board will not enforce a rule that is contrary to statute, leaving this requirement in the rule can lead to confusion for applicants in terms of what is actually required to apply for certification.

R4-1-453. While failure to update the language is unlikely to cause any substantive harm, it may confuse registrants who are familiar with the more-modern term “self-study”.

R4-1-454 and R4-1-455. If the rules are not amended as proposed, the incorporations by reference would be outdated, which would negatively affect the Board’s ability to protect the public, which in turn would negatively affect the public. It may also negatively affect registrants who would expect to conform their practices and be held accountable to current standards.

c. The estimated change in frequency of the targeted conduct expected from the rule change:

R4-1-229. Implementation of the proposed changes will benefit candidates who may be negatively affected by having to wait longer for their scores to be released. In particular, subsection (C) will implement an effective and nationally recommended transition policy, which will serve as a temporary solution for those immediately affected, whereas changes subsections (A) and (B) will overall benefit candidates and provide them more time for their conditioned credit to be valid.

R4-1-341. Removal of the letter of recommendation requirement will lead to a clearer rule that ultimately conforms with Laws 2022, Chapter 59 (HB 2612).

R4-1-453. Updating this language should clear any confusion that registrants may have had in trying to understand what a correspondence program is.

R4-1-454 and R4-1-455. Updating the incorporations by reference for the peer review standards and the AICPA’s Code of Professional Conduct will allow the

Board to hold registrants accountable to the most up-to-date standards. This serves as a benefit to the Board and the public it protects.

2. A brief summary of the information included in the economic, small business, and consumer impact statement:

Amendments to R4-1-229 are expected to positively affect the Board and Exam candidates. The Board will benefit from being able to implement an effective transition policy that is easy to understand, communicate, and implement. Exam candidates will benefit from a transition policy that minimizes candidate disruption and impact to the candidate pipeline. The credit extension may also financially benefit some Exam candidates by removing the need to re-apply for the Exam should their credit have normally expired.

Amendments to R4-1-341 are expected to positively affect applicants as the change will clarify in rule that a letter of recommendation is no longer required. The Board will benefit from eliminating any possible confusion that applicants may have had if they consulted the rule to understand requirements and conforming its rule to Laws 2022, Chapter 59 (HB 2612).

Amendments to R4-1-453 are expected to positively affect the Board and its regulated community. The Board will benefit from having a clearer rule, which will benefit the regulated community when they review the Board's continuing professional education rule.

Amendments to R4-1-454 and R4-1-455 are expected to affect the Board, consumers, and the regulated community. The Board will benefit from being able to hold registrants accountable to the most current versions of the peer review standards and the AICPA's Code of Professional Conduct, which directly ties to the Board's mission to protect the public. As this update will assist the Board in better fulfilling its mission, the public will also benefit from

the more effective protection. Lastly, the regulated community will be affected by being held accountable to these more current standards.

3. The person to contact to submit or request additional data on the information included in the economic, small business, and consumer impact statement:

Name: Monica L. Petersen, Executive Director  
Address: Board of Accountancy, 100 N. 15<sup>th</sup> Ave., Suite 165, Phoenix, AZ 85007  
Telephone: (602) 364-0870  
Fax: (602) 364-0903  
E-mail: mpetersen@azaccountancy.gov  
Website: [www.azaccountancy.gov](http://www.azaccountancy.gov)

4. Persons who will be directly affected by, bear the costs of, or directly benefit from the rulemaking:

R4-1-229. Amendments to this rule are expected to positively affect the Board, Exam candidates, the AICPA, and NASBA. The Board will benefit from being able to implement an effective transition policy that is easy to understand, communicate, and implement. The Board would likely also benefit from minimal confusion from exam candidates if it adopted the same nationally recommended transition policy implemented by other jurisdictions<sup>2</sup> in the United States. Costs to the Board would be minimal and would likely only include a de minimis reduction in state revenue (see section 9), the time and effort to update information on our website, any applicable forms/template, and other miscellaneous conforming activities. Exam candidates will benefit from a transition policy that minimizes candidate disruption and impact to the candidate pipeline. The credit extension may also financially

---

<sup>2</sup> A.R.S. § 32-701(18) states, “Jurisdiction” means, for the purpose of examination, certification, firm registration or limited reciprocity privilege, the fifty states of the United States, the District of Columbia, the United States Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands or the Commonwealth of Puerto Rico.

benefit some Exam candidates by removing the need to re-apply for the Exam should their credit have normally expired. No additional costs are expected of Exam candidates. The AICPA and NASBA would benefit from the Board's implementation of this transition policy as it would move them one step closer to ensuring a nationally consistent transition policy for all Exam candidates.

R4-1-341. Amendments to this rule are expected to positively affect applicants and the Board. The change would minimize any confusion applicants may have had if they consulted the rule to understand certification requirements. Applicants are not anticipated to bear any costs as it relates to this change. It will also positively affect the Board because the Board's rule will now conform with the practice of no longer accepting letters of recommendation. CPAs or individuals with education and experience similar to that of a CPA may also marginally benefit from this rule change as they would no longer have to draft letters of recommendation for the purpose of an applicant applying for certification.

R4-1-453. The minor amendments to this rule are expected to positively affect the Board and its regulated community. The Board will benefit from having a clearer rule that uses more modern terminology, which will benefit the regulated community when they review the Board's continuing professional education rule. There may be minimal costs to the Board in conforming language on our websites, forms, templates, etc., to match the updated language in our rule.

R4-1-454 and R4-1-455. Amendments to these rules would affect the Board, the public, and the regulated community. The Board will benefit from being able to hold registrants accountable to the most current versions of the peer review standards and the AICPA's Code of Professional Conduct, which directly ties to the Board's mission to protect the public. As this update will assist the Board in better fulfilling its mission, the public will also benefit

from the more effective protection. Lastly, the regulated community will be affected by being held accountable to these more current standards as it would cause confusion to the regulated community for the Board to enforce older standards.

5. Cost-benefit analysis:

- a. Costs and benefits to state agencies directly affected by the rulemaking including the number of new full-time employees at the implementing agency required to implement and enforce the proposed rule:

The Board is the only state agency directly affected by this rulemaking. Its effects, including costs and benefits, have been listed in Item 4 above. The Board will not require a new full-time employee to implement and enforce the rulemaking, but there will be some opportunity costs in that human resources will be tasked with the implementation of these rules rather than other Board initiatives.

- b. Costs and benefits to political subdivisions directly affected by the rulemaking:

No political subdivision is directly affected by this rulemaking.

- c. Costs and benefits to businesses directly affected by the rulemaking:

Businesses that are registered with the Board as CPA firms (which are part of the regulated community) will be directly affected by the rulemaking. Its effects, including costs and benefits, have been listed in Item 4 above. The AICPA and NASBA will be directly affected by the rulemaking, in particular the implementation of the transition policy. Its effects have been listed in Item 4 above. No other businesses are expected to be affected by this rulemaking.

6. Impact on private and public employment:

The Board expects the rulemaking to have no impact on private or public employment.

7. Impact on small businesses:

a. Identification of the small business subject to the rulemaking:

Similar to Item 5.c, small businesses that are registered with the Board as CPA firms (Small Business CPA Firms) will be directly affected by the rulemaking as they are part of the regulated community. Its effects, including costs and benefits, have been listed in Item 4 above.

b. Administrative and other costs required for compliance with the rulemaking:

There are no additional costs required for compliance with the rulemaking.

c. Description of methods that may be used to reduce the impact on small businesses:

None.

8. Cost and benefit to private persons and consumers who are directly affected by the rulemaking:

Private persons that are certified with the Board as a CPA, who are applying to take the Exam, or who are applying to become certified as CPAs will be directly affected by the rulemaking. Its effects, including costs and benefits, have been listed in Item 4 above.

The public, which includes consumers, will also be directly affected by the rulemaking. Its effects, including costs and benefits, have been listed in Item 4 above.

9. Probable effects on state revenues:

Implementing the changes related to conditioned credit in A.A.C. R4-1-229 will likely reduce state revenue by approximately \$800.00. An explanation of how that number was calculated

can be found in section 11 of this Economic, Small Business, and Consumer Impact Statement.

10. Less intrusive or less costly alternative methods considered:

The Board believes this is the least costly and least intrusive method. Most changes are either technical, conforming, clarifying, or directly benefit applicants.

11. Description of data used:

a. Data regarding probable effects on state revenue

To answer this question, we used proxy data to develop an approximate as we do not have direct quantitative data to reference for this particular situation. We used the numbers of conditioned credit extension requests received for calendar year 2022 and multiplied it by our re-examination fee (\$50.00). The data is empirical, replicable, and testable, as the information was gathered and compiled in the course of normal business.



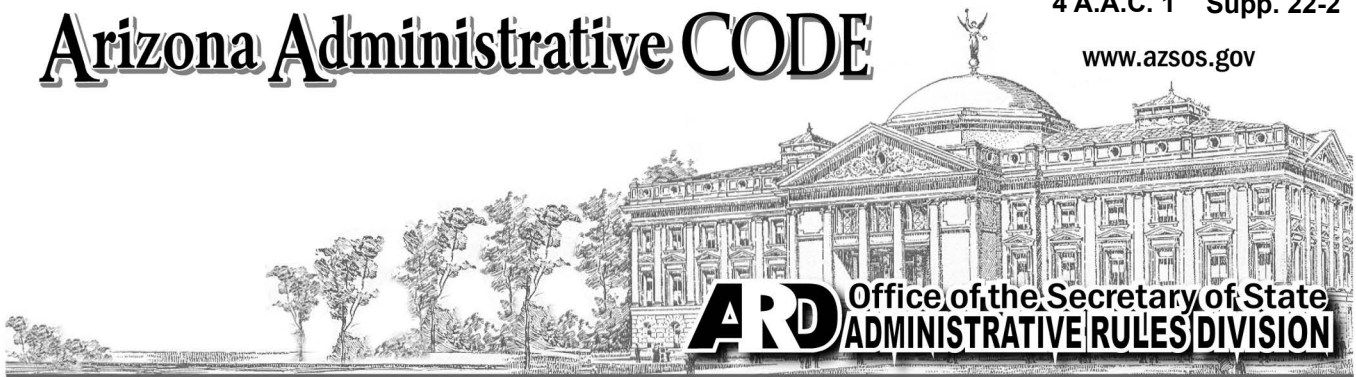
## **MATERIAL INCORPORATED BY REFERENCE**

R4-1-454(A) – Standards for Performing and Reporting on Peer Reviews

<https://www.aicpa.org/content/dam/aicpa/research/standards/peerreview/downloadabledocuments/peerreviewstandards.pdf>

R4-1-455(A) – Code of Professional Conduct

<https://pub.aicpa.org/codeofconduct/ethicsresources/et-cod.pdf>



## TITLE 4. PROFESSIONS AND OCCUPATIONS

### CHAPTER 1. BOARD OF ACCOUNTANCY

The table of contents on page one contains links to the referenced page numbers in this Chapter.

Refer to the notes at the end of a Section to learn about the history of a rule as it was published in the *Arizona Administrative Register*.

This Chapter contains rules that were filed to be codified in the *Arizona Administrative Code* between the dates of April 1, 2022 through June 30, 2022

<a href="#">R4-1-101.</a>	<a href="#">Definitions .....</a>	<a href="#">3</a>	<a href="#">R4-1-453.</a>	<a href="#">Continuing Professional Education .....</a>	<a href="#">13</a>
<a href="#">R4-1-104.</a>	<a href="#">Board Records; Public Access; Copying Fees .....</a>	<a href="#">3</a>	<a href="#">R4-1-454.</a>	<a href="#">Peer Review .....</a>	<a href="#">15</a>
<a href="#">R4-1-115.03.</a>	<a href="#">Peer Review Oversight Advisory Committee .....</a>	<a href="#">5</a>	<a href="#">R4-1-455.</a>	<a href="#">Professional Conduct and Standards .....</a>	<a href="#">15</a>
<a href="#">R4-1-345.</a>	<a href="#">Registration; Fees .....</a>	<a href="#">11</a>			

#### Questions about these rules? Contact:

Board: Board of Accountancy  
 Address: 100 N. 15th Ave., Suite 165  
 Phoenix, AZ 85007  
 Website: [www.azaccountancy.gov](http://www.azaccountancy.gov)  
 Name: Monica L. Petersen, Executive Director  
 Telephone: (602) 364-0870  
 Fax: (602) 364-0903  
 Email: [mpetersen@azaccountancy.gov](mailto:mpetersen@azaccountancy.gov)

#### The release of this Chapter in Supp. 22-2 replaces Supp. 21-2, 1-17 pages

Please note that the Chapter you are about to replace may have rules still in effect after the publication date of this supplement. Therefore, all superseded material should be retained in a separate binder and archived for future reference.

## PREFACE

Under Arizona law, the Department of State, Office of the Secretary of State (Office), Administrative Rules Division, accepts state agency rule notice and other legal filings and is the publisher of Arizona rules. The Office of the Secretary of State does not interpret or enforce rules in the *Administrative Code*. Questions about rules should be directed to the state agency responsible for the promulgation of the rule.

Scott Cancelosi, Director  
ADMINISTRATIVE RULES DIVISION

---

### RULES

The definition for a rule is provided for under A.R.S. § 41-1001. “Rule’ means an agency statement of general applicability that implements, interprets, or prescribes law or policy, or describes the procedures or practice requirements of an agency.”

### THE ADMINISTRATIVE CODE

The *Arizona Administrative Code* is where the official rules of the state of Arizona are published. The *Code* is the official codification of rules that govern state agencies, boards, and commissions.

The *Code* is separated by subject into Titles. Titles are divided into Chapters. A Chapter includes state agency rules. Rules in Chapters are divided into Articles, then Sections. The “R” stands for “rule” with a sequential numbering and lettering outline separated into subsections.

Rules are codified quarterly in the *Code*. Supplement release dates are printed on the footers of each Chapter.

First Quarter: January 1 - March 31

Second Quarter: April 1 - June 30

Third Quarter: July 1 - September 30

Fourth Quarter: October 1 - December 31

For example, the first supplement for the first quarter of 2022 is cited as Supp. 22-1. Supplements are traditionally released three to four weeks after the end of the quarter because filings are accepted until the last day of the quarter.

Please note: The Office publishes by Chapter, not by individual rule Section. Therefore there might be only a few Sections codified in each Chapter released in a supplement. This is why the Office lists only updated codified Sections on the previous page.

### RULE HISTORY

Refer to the HISTORICAL NOTE at the end of each Section for the effective date of a rule. The note also includes the *Register* volume and page number in which the notice was published (A.A.R.) and beginning in supplement 21-4, the date the notice was published in the *Register*.

### AUTHENTICATION OF PDF CODE CHAPTERS

The Office began to authenticate Chapters of the *Code* in Supp. 18-1 to comply with A.R.S. § 41-1012(B) and A.R.S. § 5302(1), (2)(d) through (e), and (3)(d) through (e).

A certification verifies the authenticity of each *Code* Chapter posted as it is released by the Office of the Secretary of State. The authenticated pdf of the *Code* includes an integrity mark with a certificate ID. Users should check the validity of the signature, especially if the pdf has been downloaded. If the digital signature is invalid it means the document’s content has been compromised.

### HOW TO USE THE CODE

Rules may be in effect before a supplement is released by the Office. Therefore, the user should refer to issues of the *Arizona Administrative Register* for recent updates to rule Sections.

### ARIZONA REVISED STATUTE REFERENCES

The Arizona Revised Statutes (A.R.S.) are available online at the Legislature’s website, [www.azleg.gov](http://www.azleg.gov). An agency’s authority note to make rules is often included at the beginning of a Chapter. Other Arizona statutes may be referenced in rule under the A.R.S. acronym.

### SESSION LAW REFERENCES

Arizona Session Law references in a Chapter can be found at the Secretary of State’s website, [www.azsos.gov](http://www.azsos.gov) under Services-> Legislative Filings.

### EXEMPTIONS FROM THE APA

It is not uncommon for an agency to be exempt from the steps outlined in the rulemaking process as specified in the Arizona Administrative Procedures Act, also known as the APA (Arizona Revised Statutes, Title 41, Chapter 6, Articles 1 through 10). Other agencies may be given an exemption to certain provisions of the Act.

An agency’s exemption is written in law by the Arizona State Legislature or under a referendum or initiative passed into law by Arizona voters.

When an agency files an exempt rulemaking package with our Office it specifies the law exemption in what is called the preamble of rulemaking. The preamble is published in the *Register* online at [www.azsos.gov/rules](http://www.azsos.gov/rules), click on the *Administrative Register* link.

Editor’s notes at the beginning of a Chapter provide information about rulemaking Sections made by exempt rulemaking. Exempt rulemaking notes are also included in the historical note at the end of a rulemaking Section.

The Office makes a distinction to certain exemptions because some rules are made without receiving input from stakeholders or the public. Other exemptions may require an agency to propose exempt rules at a public hearing.

### PERSONAL USE/COMMERCIAL USE

This Chapter is posted as a public courtesy online, and is for private use only. Those who wish to use the contents for resale or profit should contact the Office about Commercial Use fees. For information on commercial use fees review A.R.S. § 39-121.03 and 1 A.A.C. 1, R1-1-113.

*Rhonda Paschal, rules managing editor, assisted with the editing of this Chapter.*



Administrative Rules Division  
 The Arizona Secretary of State electronically publishes each A.A.C. Chapter with a digital certificate. The certificate-based signature displays the date and time the document was signed and can be validated in Adobe Acrobat Reader.

**TITLE 4. PROFESSIONS AND OCCUPATIONS**

**CHAPTER 1. BOARD OF ACCOUNTANCY**

Authority: A.R.S. § 32-701 et seq.

**Supp. 22-2**

**CHAPTER TABLE OF CONTENTS**

**ARTICLE 1. GENERAL**

Section	
R4-1-101.	Definitions ..... 3
R4-1-102.	Powers of the Board: Applicability; Excuse; Extension ..... 3
R4-1-103.	Repealed ..... 3
R4-1-104.	Board Records; Public Access; Copying Fees ..... 3
R4-1-105.	Expired ..... 4
R4-1-106.	Reserved ..... 4
R4-1-107.	Reserved ..... 4
R4-1-108.	Reserved ..... 4
R4-1-109.	Reserved ..... 4
R4-1-110.	Reserved ..... 4
R4-1-111.	Reserved ..... 4
R4-1-112.	Reserved ..... 4
R4-1-113.	Meetings ..... 4
R4-1-114.	Hearing; Rehearing or Review ..... 4
R4-1-115.	Accounting and Auditing and Tax Advisory Committees ..... 5
R4-1-115.01.	Law Review Advisory Committee ..... 5
R4-1-115.02.	Continuing Professional Education Advisory Committee ..... 5
R4-1-115.03.	Peer Review Oversight Advisory Committee ..... 5
R4-1-115.04.	Certification Advisory Committee ..... 5
R4-1-116.	Renumbered ..... 5
R4-1-117.	Procedure: Witnesses; Service ..... 5
R4-1-118.	Repealed ..... 6

**ARTICLE 2. CPA EXAMINATION**

Section	
R4-1-201.	Reserved ..... 6
R4-1-202.	Reserved ..... 6
R4-1-203.	Reserved ..... 6
R4-1-204.	Reserved ..... 6
R4-1-205.	Reserved ..... 6
R4-1-206.	Reserved ..... 6
R4-1-207.	Reserved ..... 6
R4-1-208.	Reserved ..... 6
R4-1-209.	Reserved ..... 6
R4-1-210.	Reserved ..... 6
R4-1-211.	Reserved ..... 6
R4-1-212.	Reserved ..... 6
R4-1-213.	Reserved ..... 6
R4-1-214.	Reserved ..... 6
R4-1-215.	Reserved ..... 6
R4-1-216.	Reserved ..... 7
R4-1-217.	Reserved ..... 7
R4-1-218.	Reserved ..... 7
R4-1-219.	Reserved ..... 7
R4-1-220.	Reserved ..... 7
R4-1-221.	Reserved ..... 7
R4-1-222.	Reserved ..... 7

R4-1-223.	Reserved ..... 7
R4-1-224.	Reserved ..... 7
R4-1-225.	Reserved ..... 7
R4-1-226.	Expired ..... 7
R4-1-226.01.	Applications; Examination - Computer-based ..... 7
R4-1-227.	Repealed ..... 7
R4-1-228.	Denial of Examination ..... 8
R4-1-229.	Conditioned Credit ..... 8
R4-1-230.	Expired ..... 8
R4-1-231.	Expired ..... 8

**ARTICLE 3. CERTIFICATION AND REGISTRATION**

Section	
R4-1-301.	Reserved ..... 8
R4-1-302.	Reserved ..... 8
R4-1-303.	Reserved ..... 8
R4-1-304.	Reserved ..... 8
R4-1-305.	Reserved ..... 8
R4-1-306.	Reserved ..... 8
R4-1-307.	Reserved ..... 8
R4-1-308.	Reserved ..... 8
R4-1-309.	Reserved ..... 8
R4-1-310.	Reserved ..... 8
R4-1-311.	Reserved ..... 8
R4-1-312.	Reserved ..... 8
R4-1-313.	Reserved ..... 8
R4-1-314.	Reserved ..... 8
R4-1-315.	Reserved ..... 8
R4-1-316.	Reserved ..... 8
R4-1-317.	Reserved ..... 8
R4-1-318.	Reserved ..... 8
R4-1-319.	Reserved ..... 8
R4-1-320.	Reserved ..... 8
R4-1-321.	Reserved ..... 8
R4-1-322.	Reserved ..... 8
R4-1-323.	Reserved ..... 8
R4-1-324.	Reserved ..... 8
R4-1-325.	Reserved ..... 8
R4-1-326.	Reserved ..... 8
R4-1-327.	Reserved ..... 8
R4-1-328.	Reserved ..... 8
R4-1-329.	Reserved ..... 9
R4-1-330.	Reserved ..... 9
R4-1-331.	Reserved ..... 9
R4-1-332.	Reserved ..... 9
R4-1-333.	Reserved ..... 9
R4-1-334.	Reserved ..... 9
R4-1-335.	Reserved ..... 9
R4-1-336.	Reserved ..... 9
R4-1-337.	Reserved ..... 9
R4-1-338.	Reserved ..... 9
R4-1-339.	Reserved ..... 9

CHAPTER 1. BOARD OF ACCOUNTANCY

R4-1-340.	Reserved .....	9	R4-1-428.	Reserved .....	12
R4-1-341.	CPA Certificates; Firm Registration; Reinstatement; Reactivation .....	9	R4-1-429.	Reserved .....	12
R4-1-341.01.	Repealed .....	11	R4-1-430.	Reserved .....	13
R4-1-342.	Repealed .....	11	R4-1-431.	Reserved .....	13
R4-1-343.	Education and Accounting Experience .....	11	R4-1-432.	Reserved .....	13
R4-1-344.	Denial of Certification, Firm Registration, or Reinstatement .....	11	R4-1-433.	Reserved .....	13
R4-1-345.	Registration; Fees .....	11	R4-1-434.	Reserved .....	13
R4-1-346.	Notice of Change of Address .....	12	R4-1-435.	Reserved .....	13
	<b>ARTICLE 4. REGULATION</b>		R4-1-436.	Reserved .....	13
Section			R4-1-437.	Reserved .....	13
R4-1-401.	Reserved .....	12	R4-1-438.	Reserved .....	13
R4-1-402.	Reserved .....	12	R4-1-439.	Reserved .....	13
R4-1-403.	Reserved .....	12	R4-1-440.	Reserved .....	13
R4-1-404.	Reserved .....	12	R4-1-441.	Reserved .....	13
R4-1-405.	Reserved .....	12	R4-1-442.	Reserved .....	13
R4-1-406.	Reserved .....	12	R4-1-443.	Reserved .....	13
R4-1-407.	Reserved .....	12	R4-1-444.	Reserved .....	13
R4-1-408.	Reserved .....	12	R4-1-445.	Reserved .....	13
R4-1-409.	Reserved .....	12	R4-1-446.	Reserved .....	13
R4-1-410.	Reserved .....	12	R4-1-447.	Reserved .....	13
R4-1-411.	Reserved .....	12	R4-1-448.	Reserved .....	13
R4-1-412.	Reserved .....	12	R4-1-449.	Reserved .....	13
R4-1-413.	Reserved .....	12	R4-1-450.	Reserved .....	13
R4-1-414.	Reserved .....	12	R4-1-451.	Reserved .....	13
R4-1-415.	Reserved .....	12	R4-1-452.	Reserved .....	13
R4-1-416.	Reserved .....	12	R4-1-452.	Reserved .....	13
R4-1-417.	Reserved .....	12	R4-1-453.	Continuing Professional Education .....	13
R4-1-418.	Reserved .....	12	R4-1-454.	Peer Review .....	15
R4-1-419.	Reserved .....	12	R4-1-455.	Professional Conduct and Standards .....	15
R4-1-420.	Reserved .....	12	R4-1-455.01.	Professional Conduct: Definitions; Interpretations .....	15
R4-1-421.	Reserved .....	12	R4-1-455.02.	Professional Conduct: Competence and Technical Standards .....	15
R4-1-422.	Reserved .....	12	R4-1-455.03.	Professional Conduct: Specific Responsibilities and Practices .....	16
R4-1-423.	Reserved .....	12	R4-1-455.04.	Professional Conduct: Records Disposition .....	16
R4-1-424.	Reserved .....	12	R4-1-456.	Reporting Practice Suspensions and Violations .....	16
R4-1-425.	Reserved .....	12	Appendix A.	Repealed .....	17
R4-1-426.	Reserved .....	12	Appendix B.	Repealed .....	17
R4-1-427.	Reserved .....	12			

## CHAPTER 1. BOARD OF ACCOUNTANCY

## ARTICLE 1. GENERAL

**R4-1-101. Definitions**

- A.** The definitions in A.R.S. § 32-701 apply to this Chapter.
- B.** In this Chapter, unless the context otherwise requires:
1. "Contested case" means any proceeding in which the legal rights, duties, or privileges of a party are required by law to be determined by any agency after an opportunity for hearing.
  2. "CPE" or "continuing professional education" means attending classes, writing articles, conducting or teaching courses, and taking self-study courses if the activities contribute to maintaining and improving of professional competence in accounting.
  3. "Facilitated State Board Access (FSBA)" means the sponsoring organization's process for providing the Board access to peer review results via a secured website.
  4. "Party" means each person or agency named or admitted as a party, or properly seeking and entitled, as of right, to be admitted as a party.
  5. "Peer review" means an assessment, conducted according to R4-1-454(A), of one or more aspects of the professional work of a firm.
  6. "Peer review program" means the sponsoring organization's entire peer review process, including but not limited to the standards for administering, performing and reporting on peer reviews, oversight procedures, training, and related guidance materials.
  7. "Person" may include any individual, and any form of corporation, partnership, or professional limited liability company.
  8. "Principal place of business" means the office designated by the individual as the principal location for the individual's practice of accounting.
  9. "Sponsoring organization" means a Board-approved professional society, or other organization approved by the Board responsible for the facilitation and administration of peer reviews through use of its peer review program and peer review standards.
  10. "Upper level course" means a course taken beyond the basic level, after any required prerequisite or introductory accounting course and does not include principles of accounting or similar introductory accounting courses.

**Historical Note**

Former Rule 1A; Amended effective February 22, 1978 (Supp. 78-1). Former Section R4-1-01 renumbered as Section R4-1-101 without change effective July 1, 1983 (Supp. 83-4). Amended effective August 21, 1986 (Supp. 86-4). Amended effective December 6, 1995 (Supp. 95-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 10 A.A.R. 4352, effective December 4, 2004 (Supp. 04-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-102. Powers of the Board: Applicability; Excuse; Extension**

- A.** This Chapter applies to all actions and proceedings of the Board and is deemed part of the record in every action or proceeding without formal introduction or reference. All parties are deemed to have knowledge of this Chapter, which the Board shall make available on the Board's website.

- B.** The Board, when within the Board's jurisdiction, may, in the interest of justice, excuse the failure of any person to comply with any part of this Chapter.
- C.** The Board, or in case of an emergency, the President or Executive Director, when within the Board's jurisdiction, may grant an extension of time to comply with this Chapter.

**Historical Note**

Former Rules 1B, 1C, 1D, 1E; Former Section R4-1-02 renumbered as Section R4-1-102 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-103. Repealed****Historical Note**

Former Rule 2E; Former Section R4-1-03 renumbered as Section R4-1-103 without change effective July 1, 1983 (Supp. 83-4). Repealed effective August 21, 1986 (Supp. 86-4).

**R4-1-104. Board Records; Public Access; Copying Fees**

- A.** The Board shall maintain all records, subject to A.R.S. Title 39, Chapter 1, reasonably necessary or appropriate to maintain an accurate knowledge of the Board's official activities including, but not limited to:
1. Applications for CPA certificates and supporting documentation and correspondence;
  2. Applications to take the Uniform Certified Public Accountant Examination;
  3. Registration for registrants;
  4. Documents, transcripts, and pleadings relating to disciplinary proceedings and to hearings on the denial of a certificate; and;
  5. Investigative reports; staff memoranda; and general correspondence between any person and the Board, members of the Board, or staff members.
- B.** Any person desiring to inspect or obtain copies of records of the Board available to the public under this section shall make a request to the Board's Executive Director or the Director's designee. The Executive Director or the director's designee shall, as soon as possible within a reasonable time, advise the person making the request whether the records sought can be made available, or, if the Executive Director or the director's designee is unsure whether a record may be made available for public inspection and copying, the Executive Director or the director's designee shall refer the matter to the Board for final determination.
- C.** A person shall not remove original records of the Board from the office of the Board unless the records are in the custody and control of a board member, a member of the Board's committees or staff, or the Board's attorney. The Executive Director or the director's designee may designate a staff member to observe and monitor any examination of Board records.
- D.** The Board shall provide copies of all records available for public inspection and copying shall be provided according to the procedures described in A.R.S. Title 39, Chapter 1, Article 2.
- E.** Any person aggrieved by a decision of the Executive Director or the director's designee denying access to records of the Board may request a hearing before the Board to review the action of the Executive Director or the director's designee by filing a written request for hearing. Within 60 days of receipt of the request, the Board shall conduct a hearing on the matter. If the person requires immediate access to Board records, the

## CHAPTER 1. BOARD OF ACCOUNTANCY

person may request and may be granted an earlier hearing, if the person sets forth sufficient grounds for immediate access.

**Historical Note**

Adopted effective January 3, 1977 (Supp. 77-1). Amended effective February 22, 1978 (Supp. 78-1). Amended effective July 17, 1978 (Supp. 78-4). Former Section R4-1-04 renumbered as Section R4-1-104 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-105. Expired****Historical Note**

Adopted effective January 3, 1977 (Supp. 77-1). Former Section R4-1-05 renumbered as Section R4-1-105 and amended in subsections (C) and (D) effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Section expired under A.R.S. § 41-1056(J) at 25 A.A.R. 3719, effective December 4, 2019 (Supp. 19-4).

**R4-1-106. Reserved****R4-1-107. Reserved****R4-1-108. Reserved****R4-1-109. Reserved****R4-1-110. Reserved****R4-1-111. Reserved****R4-1-112. Reserved****R4-1-113. Meetings**

The Board and Board committees shall conduct meetings in accordance with the current edition of Robert's Rules of Order if the rules are compatible with the laws of the state of Arizona or the Board's own resolutions regarding meetings.

1. Regular and special meetings of the Board for the purpose of conducting business shall be called by the President or a majority of the board members.
2. Regular and special meetings of the committees shall be called by the chairperson or a majority of the committee members.

**Historical Note**

Former Rules 2A, 2B, 2C, 2D; Former Section R4-1-13 renumbered as Section R4-1-113 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-114. Hearing; Rehearing or Review**

A. Hearing: The Board or an Administrative Law Judge (ALJ) employed by the Office of Administrative Hearings (OAH) shall hear all contested cases and appealable agency actions. The Board shall conduct hearings according to the provisions of A.R.S. Title 41, Chapter 6, Article 10 as supplemented by R4-1-117. The OAH shall conduct hearings according to A.R.S. Title 41, Chapter 6, Article 10 and the rules and proce-

dures established by the OAH. To the extent that there is no conflict with A.R.S. Title 41, Chapter 6, Article 10, the provisions of A.R.S. § 32-743 apply to hearings conducted by the Board and the OAH. The following subsections apply to hearings conducted by the Board and hearings conducted by the OAH where applicable.

1. Power to join any interested party: Any board member or the ALJ may join as a party applicant or as a party defendant, any person, firm or corporation, that appears to have an interest in the matter before the Board.
2. Stipulation at hearing: The parties may stipulate to facts that are not in dispute. The stipulation may be in writing or may be made orally by reading the stipulation into the record at the hearing. The stipulation is binding upon the parties unless the Board or the ALJ grants permission to withdraw from the stipulation. The Board or the ALJ may set aside any stipulation.
3. Settlements and consent orders: At any time before or after formal disciplinary proceedings have been instituted against a registrant, the registrant may submit to the Board an offer of conditional settlement to avoid formal disciplinary proceedings by the Board. In the offer of conditional settlement, the registrant shall agree to take specific remedial steps such as enrolling in CPE courses, limiting the scope of the registrant's practice, accepting limitation on the filing of public reports, and submitting the registrant's work product for peer review. If the Board determines that the proposed conditional settlement will protect the public safety and welfare and is more likely to rehabilitate or educate the registrant than formal disciplinary action under A.R.S. § 32-741, the Board may accept the offer and enter an order that incorporates the registrant's proposed conditional settlement and to which the registrant consents. A consent order issued under this subsection shall provide that, upon successful compliance by the registrant with all provisions of the order, the disciplinary proceedings shall be terminated and any notice of hearing previously issued shall be vacated. The consent order shall further provide that, upon failure of the registrant to comply with all provisions of the order, or upon the discovery of material facts unknown to the Board at the time the Board issued the order, formal disciplinary proceedings against the registrant may be instituted or resumed. The consent order additionally may provide that, upon failure of the registrant to comply with all provisions of the order, the Board may immediately and summarily suspend the registrant's certificate for not more than one year. Within 30 days after the summary suspension, the registrant may request a hearing solely concerning the issue of compliance with the consent order.
4. Decisions and orders: The Board shall make all decisions and orders by a majority vote of the members considering the case. The Board shall issue a final written decision in a contested case or state the decision on the record. The decision shall state separately the findings of fact and conclusions of law on which the decision is based, and the Board's order to implement the decision. All written decisions and orders of the Board shall be signed by the President or Secretary of the Board. When the Board suspends or revokes the certificate of a registrant, the Board may order the registrant to return the registrant's certificate within 30 days after receipt of the order. The Board shall serve each party, each attorney of record, and the Attorney General with a copy of each decision or order of the Board, as provided in R4-1-117.

## CHAPTER 1. BOARD OF ACCOUNTANCY

- B.** ALJ: In hearings conducted by the OAH, the ALJ shall provide the Board with written findings of fact, conclusions of law, and a recommended order within 20 days after the conclusion of the hearing or as otherwise provided by A.R.S. Title 41, Chapter 6, Article 10. The Board's decision approving or modifying the ALJ's recommendations is the final decision of the Board, subject to the filing of a motion for rehearing or review as provided in subsection (C).
- C.** Rehearing or Review: Any party aggrieved by a decision of the Board may file with the Board a written motion for rehearing or review within 30 days after service of the decision specifying the particular grounds for the motion. The Attorney General may file a response to the motion for rehearing within 15 days after service of the motion. The Board may require the filing of written briefs upon issues raised in the motion for rehearing or review and provide for oral argument. Upon review of the documents submitted, the Board may modify the decision or vacate it and grant a rehearing for any of the following causes materially affecting a party's rights:
1. Irregularity in the administrative proceedings or any order or abuse of discretion, that deprived a party of a fair hearing;
  2. Misconduct of the Board or the ALJ;
  3. Accident or surprise that could not have been prevented by ordinary prudence;
  4. Newly discovered material evidence, that could not with reasonable diligence have been discovered and produced at the original hearing;
  5. Excessive or insufficient penalties;
  6. Error in the admission or rejection of evidence or other errors of law occurring at the administrative hearing, or during the progress of the proceeding; or
  7. That the findings of fact or decision is not justified by the evidence or is contrary to law.

**Historical Note**

Former Rules 5A, 5B, 5C; Amended effective January 3, 1977 (Supp. 77-1). Amended effective February 22, 1978 (Supp. 78-1). Former Section R4-1-14 renumbered as Section R4-1-114 without change effective July 1, 1983 (Supp. 83-4). Amended effective December 6, 1995 (Supp. 95-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-115. Accounting and Auditing and Tax Advisory Committees**

- A.** The Board may appoint advisory committees concerning accounting reports, taxation and other areas of public accounting as the Board deems appropriate. The committees shall evaluate investigation files referred by the Board, hold voluntary informal interviews and make advisory recommendations to the Board concerning settlement, dismissal or other disposition of the reviewed matter.
- B.** The Board, in its discretion, may accept, reject, or modify the recommendation of the advisory committee.

**Historical Note**

Adopted effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-115.01. Law Review Advisory Committee**

- A.** The Board may appoint an advisory committee to assist in the evaluation of statutory and regulatory provisions. The committee shall make advisory recommendations to the Board.

- B.** The Board, in its discretion, may accept, reject, or modify the recommendations of the advisory committee.

**Historical Note**

Adopted effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-115.02. Continuing Professional Education Advisory Committee**

- A.** The Board may appoint an advisory committee to assist in the evaluation of CPE. The committee shall make advisory recommendations to the Board concerning the following:
1. CPE programs;
  2. A registrant's satisfaction of CPE requirements; and
  3. A registrant's compliance with disciplinary orders requiring CPE.
- B.** The Board, in its discretion, may accept, reject, or modify the recommendations of the advisory committee.

**Historical Note**

Adopted effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-115.03. Peer Review Oversight Advisory Committee**

- A.** The Board may appoint an advisory committee to:
1. Make advisory recommendations to the Board concerning peer review, and
  2. Monitor the peer review program and report to the Board on its effectiveness.
- B.** The Board may accept, reject, or modify recommendations of the Peer Review Oversight Advisory Committee.

**Historical Note**

New Section made by final rulemaking at 10 A.A.R. 4352, effective December 4, 2004 (04-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-115.04. Certification Advisory Committee**

- A.** The Board may appoint an advisory committee to assist in the evaluation of applicants for the Uniform Certified Public Accountant Examination and for certified public accountant. The committee shall review applications, transcripts, and related materials, and make advisory recommendations to the Board concerning the qualifications of applicants for the Uniform Certified Public Accountant Examination and for certification of certified public accountants.
- B.** The Board, in its discretion, may accept, reject, or modify the advisory recommendation in determining the qualifications of applicants.

**Historical Note**

New Section R4-1-115.04 renumbered from R4-1-116 and amended by final rulemaking, effective February 4, 2014 (Supp. 14-1).

**R4-1-116. Renumbered****Historical Note**

Adopted effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Section R4-1-116 renumbered to R4-1-115.04 by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-117. Procedure: Witnesses; Service**



CHAPTER 1. BOARD OF ACCOUNTANCY

- A. Pleadings; depositions; briefs; and related documents. A party shall print or type all pleadings, depositions, briefs, and related documents and use only one side of the paper.
- B. Witness' depositions. If a party wants to take the oral deposition of a witness residing outside the state, the party shall file with the Board a petition for permission to take the deposition stating the name and address of the witness and describing in detail the nature and substance of the testimony expected to be given by the witness. The petition may be denied if the testimony of the witness is not relevant and material. If the petition is granted, the party may proceed to take the deposition of the witness by complying with the Arizona Rules of Civil Procedure. The party applying to the Board for permission to take a deposition shall bear the expense of the deposition.
- C. Witness' interrogatories. A party desiring to take the testimony of a witness residing outside the state by means of interrogatories may do so by serving the adverse party as in civil matters and by filing with the Board a copy of the interrogatories and a statement showing the name and address of the witness. The adverse party may file in duplicate cross-interrogatories with a copy of the statement within 10 days following service on the adverse party. A party that objects to the form of an interrogatory or cross-interrogatory may file a statement of the objection with the Board within five days after service of the interrogatories or cross-interrogatories and may suggest to the Board any amendment to an interrogatory or cross-interrogatory. The Board may amend, add, or strike out an interrogatory or cross-interrogatory when the Board determines it is proper to do so.
  - 1. Notwithstanding the fact that a party may petition for permission to take the oral deposition of a witness, the Board may require that the information be provided through written interrogatories and vice versa.
  - 2. A party shall provide a copy of answers to the interrogatories to the Board within 45 days after the interrogatories are answered.
- D. Subpoenas. The Board officer presiding at a hearing may authorize subpoenas for the attendance of witnesses and for the production of books, records, documents, and other evidence, and shall administer oaths. A party desiring the Board to issue a subpoena for the production of evidence, documents or to compel the appearance of a witness at a hearing shall apply for the subpoena in writing stating the substance of the witness's testimony. If the testimony appears to be relevant and material, the Board shall issue the subpoena. Affixing the seal of the Board and the signature of a Board officer is sufficient to show that the subpoena is genuine. The party applying for the subpoena shall bear the expense of service.
- E. Service.
  - 1. Service of any decision, order, subpoena, notice, or other document may be made personally in the same manner as a summons served in a civil action. If a document is served personally, service is deemed complete at the time of delivery.
  - 2. Except as provided in subsection (E)(3), service of any document may also be made by:
    - a. Personal service.
    - b. By enclosing a copy of the document in a sealed envelope and depositing the envelope in the United States mail, with first-class postage prepaid, addressed to the party, at the address last provided to the Board.
      - i. Service by mail is deemed complete when the document to be served is deposited in the United States mail. If the distance between the place of mailing and the place of address is

- more than 100 miles, service is deemed complete one day after the deposit of the document for each 100 miles to a maximum of six days after the date of mailing.
- ii. In computing time, the date of mailing is not counted. All intermediate Sundays and holidays are counted. If the last day falls on a Sunday or holiday, that day is not counted and service is considered completed on the next business day.
- c. By attaching the document to an email and sending it to the email address last provided to the Board.
- 3. The Board shall mail each notice of hearing and final decision by certified mail to the last known address reflected in the records of the Board.
- 4. Service on attorney. Service on an attorney who has appeared for a party constitutes service on the party.
- 5. Proof of service. A party shall demonstrate proof of service by filing an affidavit, as provided by law, proof of mailing by certified mail, or an affidavit of first-class mailing.

**Historical Note**

Former Rules 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D; Amended effective January 3, 1977 (Supp. 77-1). Former Section R4-1-15 renumbered as Section R4-1-117 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2).

**R4-1-118. Repealed**

**Historical Note**

Former Rule 8; Amended effective January 3, 1977 (Supp. 77-1). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-16 renumbered as Section R4-1-118 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 1, 1995 (Supp. 95-4). Repealed by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**ARTICLE 2. CPA EXAMINATION**

- R4-1-201. Reserved
- R4-1-202. Reserved
- R4-1-203. Reserved
- R4-1-204. Reserved
- R4-1-205. Reserved
- R4-1-206. Reserved
- R4-1-207. Reserved
- R4-1-208. Reserved
- R4-1-209. Reserved
- R4-1-210. Reserved
- R4-1-211. Reserved
- R4-1-212. Reserved
- R4-1-213. Reserved
- R4-1-214. Reserved
- R4-1-215. Reserved

## CHAPTER 1. BOARD OF ACCOUNTANCY

R4-1-216.	Reserved
R4-1-217.	Reserved
R4-1-218.	Reserved
R4-1-219.	Reserved
R4-1-220.	Reserved
R4-1-221.	Reserved
R4-1-222.	Reserved
R4-1-223.	Reserved
R4-1-224.	Reserved
R4-1-225.	Reserved
R4-1-226.	Expired

**Historical Note**

Former Rules 6A, 6B, 6C; Amended effective January 15, 1976 (Supp. 76-1). Amended effective December 1, 1976 (Supp. 76-5). Amended effective July 17, 1978 (Supp. 78-4). Amended effective November 5, 1980 (Supp. 80-5). Former Section R4-1-26 renumbered as Section R4-1-226 and amended in subsections (B) and (C) effective July 1, 1983 (Supp. 83-4). Amended effective August 21, 1986 (Supp. 86-4). Amended subsection (C) effective May 25, 1989 (Supp. 89-2). Amended effective January 1, 1994; filed in the Office of the Secretary of State September 21, 1993 (Supp. 93-3). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 5 A.A.R. 4575, effective January 1, 2000 (Supp. 99-4). Amended by final rulemaking at 6 A.A.R. 4815, effective January 1, 2001 (Supp. 00-4). Amended by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Section expired under A.R.S. § 41-1056(E) at 15 A.A.R. 372, effective December 31, 2008 (Supp. 09-1).

**R4-1-226.01. Applications; Examination - Computer-based**

A. A person desiring to take the Uniform Certified Public Accountant Examination who is qualified under A.R.S. § 32-723 may apply by submitting an initial application. A person whose initial application has already been approved by the Board to sit for the Uniform CPA Examination may apply by submitting an application for re-examination.

1. The requirements for initial application for examination are:
  - a. A completed application for initial examination,
  - b. A \$100 initial application fee if:
    - i. The applicant has not previously filed an application for initial examination in Arizona, or
    - ii. The Board administratively closed a previously submitted application, or
    - iii. The applicant has been previously denied by the Board.
  - c. University or college transcripts to verify that the applicant meets the educational requirements and if necessary for education taken outside the United States an additional course-by-course evaluation from the National Association of State Boards of Accountancy International Evaluation Services (NIES).
  - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
2. The requirements for application for re-examination are:

- a. A completed application for re-examination, and
  - b. A \$50 re-examination application fee.
- B. Within 30 days of receiving an initial application, the Board shall provide written notice to the applicant that the application is either complete or incomplete. If the application is incomplete, the notice shall specify what information is missing. The applicant has 30 days from the date of the Board's letter to respond to the Board's request for additional information or the Board or its designee may administratively close the file. An applicant whose file is administratively closed and who later wishes to apply shall reapply under subsection (A)(1).
  - C. The Board's certification advisory committee (CAC) shall evaluate the applicant's file and make a recommendation to the Board to approve or deny the application. The CAC may defer a decision on the applicant's file to a subsequent CAC meeting to provide the applicant opportunity to submit any information requested by written notice by the CAC that the CAC believes is relevant to make a recommendation to the Board. The applicant has 30 days from the date of the Board's letter to respond to the CAC's request for additional information or the Board or its designee may administratively close the file.
  - D. If the Board approves the application, the Board shall notify the applicant in writing and send an authorization to test (ATT) to the National Association of State Boards of Accountancy (NASBA) to permit the applicant to take the specified section or sections of the examination for which the applicant applied. If the Board denies the application, the Board shall send the applicant written notice explaining:
    1. The reason for denial, with citations to supporting statutes or rules;
    2. The applicant's right to seek a fair hearing to challenge the denial; and
    3. The time periods for appealing the denial.
  - E. If the applicant does not timely pay to the NASBA the fees owed for the examination section or sections for which the applicant applied, the ATT expires. An applicant that still wishes to take a section or sections of the Uniform CPA Examination shall submit an application for re-examination under subsection (A)(2).
  - F. After an applicant has paid NASBA, NASBA shall issue a notice to schedule (NTS) to the applicant. A NTS enables an applicant to schedule testing at an approved examination center. The NTS is effective on the date of issuance and expires when the applicant sits for all sections listed on the NTS or six months from the date of issuance, whichever occurs first. Upon written request to the Board and showing good cause that prevents the applicant from appearing for the examination, an applicant may be granted by the Board a 90-day extension to a current NTS.
  - G. The Board shall send the applicant any written notice required by this Section in accordance with R4-1-117(E)(1) or (2).

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 24 A.A.R. 3413, effective February 4, 2019 (Supp. 18-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2).

**R4-1-227. Repealed****Historical Note**

Former Rule 6D; Amended effective July 17, 1978 (Supp. 78-4). Former Section R4-1-27 renumbered and

CHAPTER 1. BOARD OF ACCOUNTANCY

amended as Section R4-1-227 effective July 1, 1983 (Supp. 83-4). Section R4-1-227 repealed effective November 20, 1998 (Supp. 98-4).

**R4-1-228. Denial of Examination**

An applicant whose application for examination is denied by the Board is entitled to a hearing before the Board or an ALJ.

1. Written application. The applicant shall file a notice of appeal under A.R.S. § 41-1092.03 within 30 days after receipt of the notice of denial.
2. Hearing notice. The Board shall provide the applicant with notice of the hearing in the manner prescribed by A.R.S. § 41-1092.05.
3. Conduct of hearing. The Board or the ALJ shall conduct the hearing in accordance with A.R.S. Title 41, Chapter 6, Article 10 and applicable rules governing hearings.
4. Burden of persuasion. At the hearing, the applicant is the moving party and has the burden of persuasion.
5. Matters limited. At the hearing, the Board or ALJ shall limit the issues to those originally presented to the Board.

**Historical Note**

Former Rules 6E, 6F; Former Section R4-1-28 renumbered as Section R4-1-228 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Section repealed; new Section made by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1).

**R4-1-229. Conditioned Credit**

- A. An applicant is allowed to sit for each section individually and in any order. An applicant is given conditioned credit for each section of the examination passed. A conditioned credit is valid for 18 months from the date of the examination. Upon written request to the Board and showing good cause, an applicant may be granted by the Board a 90-day extension to a conditioned credit.
- B. Transfer of conditioned credit. The Board shall give an applicant credit for all sections of an examination passed in another jurisdiction if the credit has been conditioned. If an applicant transfers conditioned credit from another jurisdiction, the applicant shall pass the remaining sections of the examination within the 18-month period from the date that the first section was passed. An applicant who fails to pass all sections of the Uniform CPA Examination within 18 months shall retake previously passed sections of the Uniform CPA Examination to ensure passage of all sections within an 18-month period.

**Historical Note**

Former Rules 6G, 6H; Former Section R4-1-29 renumbered as Section R4-1-229 without change effective July 1, 1983 (Supp. 83-4). Amended effective August 21, 1986 (Supp. 86-4). Section repealed, new Section adopted effective January 1, 1994; filed in the Office of the Secretary of State September 21, 1993 (Supp. 93-3). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Section repealed; New Section made by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2).

**R4-1-230. Expired**

**Historical Note**

Former Rule 6I; Former Section R4-1-30 renumbered as Section R4-1-230 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Section expired under A.R.S. § 41-1056(E) at 15 A.A.R. 372, effective December 31, 2008 (Supp. 09-1).

**R4-1-231. Expired**

**Historical Note**

Former Rule 6J; Former Section R4-1-31 renumbered as Section R4-1-231 without change effective July 1, 1983 (Supp. 83-4). Section repealed, new Section adopted effective January 1, 1994; filed in the Office of the Secretary of State September 21, 1993 (Supp. 93-3). Section expired under A.R.S. § 41-1056(E) at 10 A.A.R. 419, effective December 31, 2003 (Supp. 04-1).

**ARTICLE 3. CERTIFICATION AND REGISTRATION**

- R4-1-301. Reserved
- R4-1-302. Reserved
- R4-1-303. Reserved
- R4-1-304. Reserved
- R4-1-305. Reserved
- R4-1-306. Reserved
- R4-1-307. Reserved
- R4-1-308. Reserved
- R4-1-309. Reserved
- R4-1-310. Reserved
- R4-1-311. Reserved
- R4-1-312. Reserved
- R4-1-313. Reserved
- R4-1-314. Reserved
- R4-1-315. Reserved
- R4-1-316. Reserved
- R4-1-317. Reserved
- R4-1-318. Reserved
- R4-1-319. Reserved
- R4-1-320. Reserved
- R4-1-321. Reserved
- R4-1-322. Reserved
- R4-1-323. Reserved
- R4-1-324. Reserved
- R4-1-325. Reserved
- R4-1-326. Reserved
- R4-1-327. Reserved
- R4-1-328. Reserved
- R4-1-329. Reserved

## CHAPTER 1. BOARD OF ACCOUNTANCY

- R4-1-330. Reserved
- R4-1-331. Reserved
- R4-1-332. Reserved
- R4-1-333. Reserved
- R4-1-334. Reserved
- R4-1-335. Reserved
- R4-1-336. Reserved
- R4-1-337. Reserved
- R4-1-338. Reserved
- R4-1-339. Reserved
- R4-1-340. Reserved
- R4-1-341. CPA Certificates; Firm Registration; Reinstatement; Reactivation**
- A.** An applicant may apply for a certificate of certified public accountant or for reinstatement of a certificate by submitting:
1. An application fee of \$100; and
  2. For an applicant applying for certification under A.R.S. § 32-721(A) and (B), a completed application including:
    - a. Verification that the applicant passed the Uniform CPA Examination,
    - b. Verification that the applicant meets the education and experience requirements specified in R4-1-343,
    - c. One signed and dated letter of recommendation by a CPA or an individual who has accounting education and experience similar to that of a CPA,
    - d. Proof of a score of at least 90% on the American Institute of Certified Public Accountants (AICPA) examination in professional ethics taken within the two years immediately before the application is submitted,
    - e. Evidence of lawful presence in the United States, and
    - f. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  3. For an applicant applying for certification under A.R.S. § 32-721(A) and (C), a completed application including:
    - a. Verification that the applicant has passed the International Qualification Examination (IQEX),
    - b. License verification from each jurisdiction in which the applicant has ever been issued a certificate as a certified public accountant of which at least one must be an active certification from a jurisdiction with requirements determined by the Board to be substantially equivalent to the requirements in A.R.S. § 32-721(B) or verification that the applicant meets the education and experience requirements specified in R4-1-343,
    - c. Evidence of lawful presence in the United States, and
    - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  4. For an applicant applying for certification under A.R.S. § 32-721(A) and (D) for mutual recognition agreements adopted by the Board a completed application including:
    - a. Verification that the applicant has passed the International Qualification Examination (IQEX),
    - b. License verification from the applicant's country which has a mutual recognition agreement with the National Association of State Boards of Accountancy that has been adopted by the Board,
    - c. Evidence of lawful presence in the United States, and
    - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
- B.** An applicant may apply for a certified public accountant firm registration or for reinstatement of a registration by submitting:
1. For an applicant applying for a new firm under A.R.S. § 32-731, a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited liability companies, confirmation of business name on the Secretary of State's website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
    - b. If applicable, peer review results as prescribed by R4-1-454(A); and
    - c. Other information or documents requested by the Board to determine compliance with eligibility requirements.
  2. For an applicant applying for reinstatement from cancelled under A.R.S. § 32-732(E) a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited

## CHAPTER 1. BOARD OF ACCOUNTANCY

- liability companies, confirmation of business name on the Secretary of State's website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
- b. If applicable, peer review results as prescribed by R4-1-454(A); and
  - c. Other information or documents requested by the Board to determine compliance with eligibility requirements.
3. For an applicant applying for reinstatement from expired, relinquished, or revoked status under A.R.S. § 32-732(F) a completed application including:
    - a. Approved Articles of Incorporation for professional corporations, approved Articles of Organization for limited liability companies or professional limited liability companies, confirmation of business name on the Secretary of State's website for partnerships, limited liability partnerships, or an individual or sole proprietorship with a trademark name;
    - b. If applicable, peer review results as prescribed by R4-1-454(A);
    - c. If applicable, substantial evidence that the applicant has been completely rehabilitated with respect to the conduct that was the basis of the expiration, relinquishment or revocation of the firm's registration; and
    - d. Other information or documents requested by the Board to determine compliance with eligibility requirements.
- C.** Pursuant to Title 41, Chapter 6, Article 7.1, the Board's licensing time frames are as follows:
1. Certification/Reinstatement/Reactivation
    - a. Administrative Completeness Review Time Frame. The Board shall notify the applicant within 30 days from the receipt of the application that the application is complete.
      - i. If the application is incomplete, an incomplete notice shall specify what information is missing. If the Board issues an incomplete notice, the administrative completeness review time frame and the overall time frame are suspended from the date the notice is issued until the date the Board receives the missing information from the applicant.
      - ii. The applicant has 30 days from the date of the incomplete notice to respond in writing and provide all the missing information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (A).
    - b. Substantive Review Time Frame. The Board has 60 days to complete its substantive review.
      - i. If the Board finds deficiencies during the substantive review of the application, the Board may issue one comprehensive written request to the applicant for additional information. If the Board issues a comprehensive written request, or a supplemental request by mutual agreement, the substantive review time frame and the overall time frame are suspended from the date the request is issued until the date the Board receives the additional information from the applicant.
      - ii. The applicant has 30 days from the date of the written request to respond in writing and provide all the additional information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (B).
- may administratively close. An applicant whose file is administratively closed shall reapply under subsection (A).
- c. Overall Time Frame. The Board has 150 days to issue a written notice to an applicant approving or denying an application.
2. Firm Registration
    - a. Administrative Completeness Review Time Frame. The Board shall notify the applicant within 10 days from the receipt of the application that the application is complete.
      - i. If the application is incomplete, an incomplete notice shall specify what information is missing. If the Board issues an incomplete notice, the administrative completeness time frame and the overall time frame are suspended from the date the notice issued until the date the Board receives the missing information from the applicant.
      - ii. The applicant has 30 days from the date of the incomplete notice to respond in writing and provide all the missing information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (B).
    - b. Substantive Review Time Frame. The Board has 60 days to complete its substantive review.
      - i. If the Board finds deficiencies during the substantive review of the application, the Board may issue one comprehensive written request to the applicant for additional information. If the Board issues a comprehensive written request, or a supplemental request by mutual agreement, the substantive time frame and the overall time frame are suspended from the date the request is issued until the date the Board receives the additional information from the applicant.
      - ii. The applicant has 30 days from the date of the written request to respond in writing and provide all the additional information or the Board may administratively close the file. An applicant whose file is administratively closed shall reapply under subsection (B).
    - c. Overall Time Frame. The Board has 90 days to issue a written notice to an applicant approving or denying an application.
- D.** If the Board denies an applicant's request under this Section, the Board shall send the applicant written notice explaining:
1. The reason for denial, with citations to supporting statutes or rules;
  2. The applicant's right to seek a fair hearing to challenge the denial; and
  3. The time periods for appealing the denial.
- E.** The Board shall send the applicant any written notice required by this Section in accordance with R4-1-117(E)(1) or (2).

**Historical Note**

Former Rule 7A; Amended effective December 1, 1976 (Supp. 76-5). Amended effective November 5, 1980 (Supp. 80-5). Former Section R4-1-41 renumbered as Section R4-1-341 without change effective July 1, 1983 (Supp. 83-4). Amended effective August 21, 1986 (Supp. 86-4). Amended effective September 24, 1997 (Supp. 97-3). Amended by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Amended by final rulemaking at 13 A.A.R. 2151, effective August 4, 2007

## CHAPTER 1. BOARD OF ACCOUNTANCY

(Supp. 07-2). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2).

**R4-1-341.01. Repealed****Historical Note**

Adopted effective November 1, 1995 (Supp. 95-4). Amended effective September 24, 1997 (Supp. 97-3). Amended by final rulemaking at 9 A.A.R. 5022, effective January 3, 2004 (Supp. 03-4). Section repealed by final rulemaking at 13 A.A.R. 2151, effective August 4, 2007 (Supp. 07-2).

**R4-1-342. Repealed****Historical Note**

Former Rule 7B; Amended effective December 1, 1976 (Supp. 76-5). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-42 renumbered as Section R4-1-342 without change effective July 1, 1983 (Supp. 83-4). Amended effective March 26, 1987 (Supp. 87-1). Amended effective September 24, 1997 (Supp. 97-3). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 13 A.A.R. 2151, effective August 4, 2007 (Supp. 07-2). Repealed by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1).

**R4-1-343. Education and Accounting Experience**

- A.** To demonstrate compliance with the experience requirements of A.R.S. § 32-721(B), an applicant for certification by examination or grade transfer shall submit to the Board:
1. One or more certificates of experience, completed, signed and dated by an individual who:
    - a. Possesses personal knowledge of the applicant's work, and
    - b. Is able to confirm the applicant's accounting experience, and
    - c. Is a certified public accountant; or
    - d. Has accounting education and experience similar to that of a certified public accountant; and
  2. Other information requested by the Board for explanation or clarification of experience.
- B.** To demonstrate compliance with the experience requirements of A.R.S. § 32-721(C), an applicant for certification by reciprocity shall submit to the Board:
1. One or more certificates of experience, completed, signed and dated by an individual who:
    - a. Possesses personal knowledge of the applicant's work, and
    - b. Is able to confirm the applicant's accounting experience, and
    - c. Is a certified public accountant; or
    - d. Has accounting education and experience similar to that of a certified public accountant; or
  2. If the applicant is self-employed, the applicant shall provide a signed and dated statement indicating self-employment and three signed and dated client letters, confirming years of work experience, and
  3. Other information requested by the Board for explanation or clarification of experience.

- C.** To demonstrate compliance with the education requirements of Title 32, Chapter 6, an applicant for certification or reinstatement shall submit to the Board:

1. University or college transcripts verifying that the applicant meets the educational requirements and if necessary for education taken outside the United States, an additional course-by-course evaluation from the National Association of State Boards of Accountancy International Evaluation Services (NIES), and
2. Other information requested by the Board for explanation or clarification of education.

**Historical Note**

Former Rule 7C; Former Section R4-1-43 repealed, new Section R4-1-43 adopted effective February 22, 1978 (Supp. 78-1). Former Section R4-1-43 renumbered as Section R4-1-343 without change effective July 1, 1983 (Supp. 83-4). Amended effective May 31, 1991 (Supp. 91-2). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 13 A.A.R. 2151, effective August 4, 2007 (Supp. 07-2). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 24 A.A.R. 3413, effective February 4, 2019 (Supp. 18-4).

**R4-1-344. Denial of Certification, Firm Registration, or Reinstatement**

An applicant whose application for certification, firm registration, or reinstatement of a certificate or registration is denied by the Board is entitled to a hearing before the Board or an ALJ.

1. Written application. The applicant shall file a notice of appeal under A.R.S. § 41-1092.03 within 30 days after receipt of the notice of denial.
2. Hearing notice. The Board shall provide the applicant with notice of the hearing in the manner prescribed by A.R.S. § 41-1092.05.
3. Conduct of hearing. The Board or the ALJ shall conduct the hearing in accordance with A.R.S. Title 41, Chapter 6, Article 10 and applicable rules governing hearings.
4. Burden of persuasion. At the hearing, the applicant is the moving party and has the burden of persuasion.
5. Matters limited. At the hearing, the Board or ALJ shall limit the issues to those originally presented to the Board.

**Historical Note**

Former Rule 7D; Former Section R4-1-44 renumbered as Section R4-1-344 without change effective July 1, 1983 (Supp. 83-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1).

**R4-1-345. Registration; Fees**

- A.** Initial registration: After the Board approves an applicant's request for certification or firm registration, the registrant shall file a registration in a format prescribed by the Board and pay a registration fee under subsection (C).
- B.** Renewal registration: A registrant shall file an application for renewal registration in a format prescribed by the Board no later than 5:00 p.m. on the last business day of the month. A renewal registration is deemed filed on the date and time received in the Board office. The Board shall record the date and time either by electronic date stamp in Arizona time or on physical receipt in the board's office. The Board shall not accept a postmark as evidence of timely filing. It is the sole responsibility of the registrant to complete the renewal registration requirements at the following times:

CHAPTER 1. BOARD OF ACCOUNTANCY

1. Individual registrant: An individual registrant shall renew registration at the following times:
  - a. A registrant born in an even-numbered year shall renew registration during the month of birth in each even-numbered year.
  - b. A registrant born in an odd-numbered year shall renew registration during the month of birth in each odd-numbered year.
2. Firm registrant: A firm shall renew registration at the following times:
  - a. A business organization firm that initially registered with the Board in an even-numbered year shall renew registration during the board-approved month of the initial registration in each even-numbered year.
  - b. A business organization firm that initially registered with the Board in an odd-numbered year shall renew registration during the board-approved month of the initial registration in each odd-numbered year.
  - c. An individual or a sole proprietorship firm shall renew its registration pursuant to subsection (B)(1).
- C. Registration fees:
  1. Initial Registration Fee –
    - a. Certification – \$300 and, if applicable, a late fee of \$50.
    - b. The registration fee shall be prorated by month for an initial registration period of less than two years.
  2. Biennial Registration Fee –
    - a. Certification – \$300 and, if applicable, a late fee of \$50.
      - i. For registrations due during the period from July 1, 2020 to June 30, 2024, the biennial registration fee will be reduced temporarily to \$275.
      - ii. For registrations due beginning July 1, 2024, the biennial registration fee will revert to \$300.
    - b. Firm Registration – \$300 and, if applicable, a late fee of \$50. Under A.R.S. § 32-729, the Board shall not charge a fee for the registration of additional offices of the same firm or for the registration of a sole practitioner.

**Historical Note**

Former Rule 7F; Amended effective January 3, 1977 (Supp. 77-1). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-55 renumbered and amended as Section R4-1-346 effective July 1, 1983 (Supp. 83-4). Amended effective January 1, 1994; filed in the Office of the Secretary of State September 21, 1993 (Supp. 93-3). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 13 A.A.R. 2151, effective August 4, 2007 (Supp. 07-2). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2).

**ARTICLE 4. REGULATION**

- R4-1-401. Reserved
- R4-1-402. Reserved
- R4-1-403. Reserved
- R4-1-404. Reserved
- R4-1-405. Reserved
- R4-1-406. Reserved
- R4-1-407. Reserved
- R4-1-408. Reserved
- R4-1-409. Reserved
- R4-1-410. Reserved
- R4-1-411. Reserved
- R4-1-412. Reserved
- R4-1-413. Reserved
- R4-1-414. Reserved
- R4-1-415. Reserved
- R4-1-416. Reserved
- R4-1-417. Reserved
- R4-1-418. Reserved
- R4-1-419. Reserved
- R4-1-420. Reserved
- R4-1-421. Reserved
- R4-1-422. Reserved
- R4-1-423. Reserved
- R4-1-424. Reserved
- R4-1-425. Reserved
- R4-1-426. Reserved
- R4-1-427. Reserved
- R4-1-428. Reserved
- R4-1-429. Reserved
- R4-1-430. Reserved
- R4-1-431. Reserved

**Historical Note**

Former Rule 7E; Amended effective December 1, 1976 (Supp. 76-5). Amended effective February 22, 1978 (Supp. 78-1). Amended effective July 17, 1978 (Supp. 78-4). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-54 renumbered and amended as Section R4-1-345 effective July 1, 1983 (Supp. 83-4). Amended effective March 26, 1987 (Supp. 87-1). Amended effective July 1, 1991; filed May 2, 1991 (Supp. 91-2). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 5 A.A.R. 4575, effective January 1, 2000 (Supp. 99-4). Amended by final rulemaking at 6 A.A.R. 4815, effective January 1, 2001 (Supp. 00-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-346. Notice of Change of Address**

Within 30 days of any email, business, mailing, or residential change of address, a registrant shall notify the Board of the new address by filling out the change of address form prescribed by the Board.

## CHAPTER 1. BOARD OF ACCOUNTANCY

- R4-1-432. Reserved
- R4-1-433. Reserved
- R4-1-434. Reserved
- R4-1-435. Reserved
- R4-1-436. Reserved
- R4-1-437. Reserved
- R4-1-438. Reserved
- R4-1-439. Reserved
- R4-1-440. Reserved
- R4-1-441. Reserved
- R4-1-442. Reserved
- R4-1-443. Reserved
- R4-1-444. Reserved
- R4-1-445. Reserved
- R4-1-446. Reserved
- R4-1-447. Reserved
- R4-1-448. Reserved
- R4-1-449. Reserved
- R4-1-450. Reserved
- R4-1-451. Reserved
- R4-1-452. Reserved
- R4-1-453. **Continuing Professional Education**
- A. Measurement Standards. The Board shall use the following standards to measure the hours of credit given for CPE programs completed by an individual registrant.
1. CPE credit shall be given in one-fifth or one-half increments for periods of not less than one class hour except as noted in subsection (A)(8). The computation of CPE credit shall be measured as follows:
    - a. A class hour shall consist of a minimum of 50 continuous minutes of instruction
    - b. A half-class hour shall consist of a minimum of 25 continuous minutes of instruction
    - c. A one-fifth class hour shall consist of a minimum of 10 continuous minutes of instruction.
  2. Courses taken at colleges and universities apply toward the CPE requirement as follows:
    - a. Each semester - system credit hour is worth 15 CPE credit hours,
    - b. Each quarter - system credit hour is worth 10 CPE credit hours, and
    - c. Each noncredit class hour is worth one CPE credit hour.
  3. Each correspondence program hour is worth one CPE credit hour.
  4. Acting as a lecturer or discussion leader in a CPE program, including college courses, may be counted as CPE credit. The Board shall determine the amount of credit on the basis of actual presentation hours, and shall allow CPE credit for preparation time that is less than or equal to the presentation hours. A registrant may only claim as much preparation time as is actually spent for a presentation. Total credit earned under this subsection for service as a lecturer or discussion leader, including preparation time may not exceed 40 credit hours of the renewal period's requirement. Credit is limited to only one presentation of any seminar or course with no credit for repeat teaching of that course.
5. The following may be counted for a maximum of 20 hours of CPE credit during each renewal period.
    - a. Credit may be earned for writing and publishing articles or books that contribute to the accounting profession and is published by a recognized third-party publisher of accounting material or a sponsor as long as it is not used in conjunction with a seminar.
    - b. Credit may be earned for the writing or development of online course curriculum for undergraduate, graduate, or doctoral education that contribute to the accounting profession.
    - c. Two credit hours will be given for each 3,000 words of original material written or developed into curriculum. Materials must be at least 3,000 words in length. Multiple authors may share credit for material written or developed into curriculum.
  6. A registrant may earn a combined maximum of 40 hours of CPE credit under subsections (A)(4) and (5) during each renewal period.
  7. A registrant may earn a maximum of 20 hours of CPE during each renewal period by completing introductory computer-related courses. Computer-related courses may qualify as consulting services pursuant to subsection (C).
  8. A registrant may earn a maximum of four hours of CPE during each renewal period by completing nano-learning courses. A nano-learning program is a tutorial program designed to permit a participant to learn a given subject in a ten-minute time-frame through the use of electronic media and without interaction with a real time instructor.
  9. CPE credit shall be given in one-fifth or one-half hour increments if the CPE is a segment of a continuing series related to a specific subject as long as the segments are connected by an overarching course that is a minimum of one hour and taken within the same CPE reporting period.
  10. Credit shall not be allowed for repeat participation in any seminar or course during the registration period.
- B. Programs that Qualify. CPE credit may be given for a program that provides a formal course of learning at a professional level and contributes directly to the professional competence of participants.
1. The Board shall accept a CPE course as qualified if it:
    - a. Is developed by persons knowledgeable and experienced in the subject matter,
    - b. Provides written outlines or full text,
    - c. Is administered by an instructor or organization knowledgeable in the program, and
    - d. Uses teaching methods consistent with the study program.
  2. The Board shall accept a correspondence program which includes online or computer based programs if the sponsors maintain written records of each student's participation and records of the program outline for three years following the conclusion of the program.
  3. An ethics program taught or developed by an employer or co-worker of a registrant does not qualify for the ethics requirements of subsection (C)(4).
- C. Hour Requirement. As a prerequisite to registration pursuant to A.R.S. § 32-730(C) or to reactivate from inactive status pursuant to A.R.S. § 32-732(A), a registrant shall complete the



## CHAPTER 1. BOARD OF ACCOUNTANCY

CPE requirements during the two-year period immediately before registration or application respectively as specified under subsections (C)(1) through (5). For registration periods of less than two years CPE may be prorated by quarter, with the exception of ethics.

1. A registrant whose last registration period was for two years shall complete 80 hours of CPE.
2. A registrant shall complete a minimum of 40 hours in the subject areas of accounting, auditing, taxation, business law, or consulting services with a minimum of 16 hours in the subject areas of accounting, auditing, or taxation.
3. A registrant shall complete a minimum of 16 of the required hours:
  - a. In a classroom setting,
  - b. Through an interactive live webinar, or
  - c. By acting as a lecturer or discussion leader in a CPE program, including college courses.
4. A registrant shall complete four hours of CPE in the subject area of ethics. The four hours required by this subsection shall include a minimum of one hour of each of the following subjects:
  - a. Ethics related to the practice of accounting including the Code of Professional Conduct of the American Institute of Certified Public Accountants, and
  - b. Board statutes and administrative rules.
5. A registrant shall report, at a minimum, the CPE hours required for the registration period.
6. CPE hours completed for a registration period may not be used for a subsequent registration period in any of the following instances:
  - a. To vacate a suspension for nonregistration,
  - b. To vacate a suspension for noncompliance with CPE requirements, or
  - c. To comply with a granted CPE extension.
7. As a prerequisite to reactivate from retired status or reinstate from cancelled, expired, relinquished or revoked status, a registrant or an applicant shall complete up to 160 hours of CPE during the four-year period immediately before application to reactivate or reinstate. For periods of less than four years CPE may be prorated by quarter, with the exception of ethics.
  - a. A registrant or an applicant shall complete a minimum of 80 hours in the subject areas of accounting, auditing, taxation, business law, or consulting services with a minimum of 32 hours in the subject areas of accounting, auditing or taxation.
  - b. A registrant or an applicant shall complete a minimum of 32 hours of the required hours:
    - i. In a classroom setting,
    - ii. Through an interactive live webinar, or
    - iii. By acting as a lecturer or discussion leader in a CPE program, including college courses.
  - c. A registrant or an applicant shall complete CPE in the subject area of ethics. Four hours of ethics CPE shall be required if 1 – 24 months have passed since the last registration due date for which CPE was completed. Eight hours of ethics CPE shall be required if 25 – 48 months have passed since the last registration due date for which CPE was completed. The hours required by this subsection shall include a minimum of one hour of each of the following subjects. The following subjects shall be completed during the two-year period immediately preceding application for reactivation or reinstatement:
    - i. Ethics related to the practice of accounting including the Code of Professional Conduct of

the American Institute of Certified Public Accountants; and

ii. Board statutes and administrative rules.

- D. Reporting: A registrant or an applicant for reactivation or reinstatement, a registrant who is subject to an audit, or a registrant completing their registration must report the following details about their completed CPE:
  1. Sponsoring organization,
  2. Number of CPE credit hours,
  3. Title of program or description of content,
  4. Dates attended,
  5. Subject, and
  6. Method.
- E. In addition to the information required under subsection (D), a registrant or an applicant for reactivation or reinstatement from cancelled, expired, relinquished or revoked status, or a registrant subject to a CPE audit pursuant to subsection (G) shall provide the Board the following CPE records at its request: copies of transcripts, course outlines, and certificates of completion that include registrant's name, course provider or sponsor, course title, credit hours, and date of completion.
- F. CPE Record Retention: A registrant shall maintain CPE records for three years from the date the registration was dated as received by the Board the following documents for all CPE completed for the registration period, even if not reported on the registration: transcripts, course outlines, and certificates of completion that include registrant's name, course provider or sponsor, course title, credit hours, and date of completion.
- G. CPE audits: The Board, at its discretion, may conduct audits of a registrant's CPE and require that the registrant provide the CPE records that the registrant is required to maintain under subsection (F) to verify compliance with CPE requirements.
- H. The Board may grant a full or partial exemption from CPE requirements on demonstration of good cause for a disability for only one registration period.
- I. A non-resident registrant seeking renewal of a certificate in this state shall be determined to have met the CPE requirements of this rule by meeting the CPE requirements for renewal of a certificate in the jurisdiction in which the registrant's principal place of business is located.
  1. Non-resident applicants for renewal shall demonstrate compliance with the CPE renewal requirements of the jurisdiction in which the registrant's principal place of business is located by signing a statement to that effect on the renewal application of this state.
  2. If a non-resident registrant's principal place of business jurisdiction has no CPE requirements for renewal of a certificate or license, the non-resident registrant must comply with all CPE requirements for renewal of a certificate in this state.

#### Historical Note

Adopted effective December 19, 1979 (Supp. 79-6). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-53 renumbered as Section R4-1-453 and amended in subsections (A) and (B) effective July 1, 1983 (Supp. 83-4). Former Section R4-1-453 repealed, new Section R4-1-453 adopted effective July 15, 1988 (Supp. 88-3). Correction, Historical Note for Supp. 88-3 should read "Former Section R4-1-453 repealed, new Section R4-1-453 adopted effective January 1, 1990, filed July 15, 1988" (Supp. 89-1). Section repealed, new Section adopted effective December 6, 1995 (Supp. 95-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 10 A.A.R. 1886, effective January 1, 2005 (Supp. 04-2). Amended by final rulemaking at 14 A.A.R. 2927, effective January 1, 2009

## CHAPTER 1. BOARD OF ACCOUNTANCY

(Supp. 08-3). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 24 A.A.R. 3413, effective February 4, 2019 (Supp. 18-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-454. Peer Review**

- A.** Each firm, review team, and member of a review team shall comply with the Standards for Performing and Reporting on Peer Reviews, issued April 2019 and published June 1, 2021 in the AICPA Professional Standards by the American Institute of Certified Public Accountants, 220 Leigh Farm Road, Durham, North Carolina 27707-8110 (www.aicpa.org), which is incorporated by reference. This incorporation by reference does not include any later amendments or editions. The incorporated material is available for inspection and copying at the Board's office.
- B.** A firm must allow the sponsoring organization to make the following documents accessible to the Board via the FSBA process:
1. Peer review report which has been accepted by the sponsoring organization,
  2. Firm's letter of response accepted by the sponsoring organization, if applicable,
  3. Completion letter from the sponsoring organization,
  4. Letter or letters accepting the documents signed by the firm with the understanding that the firm agrees to take any actions required by the sponsoring organization, if applicable, and
  5. Letter signed by the sponsoring organization notifying the firm that required actions have been appropriately completed, if applicable.
- C.** Information discovered solely as a result of a peer review is not grounds for suspension or revocation of a certificate.
- D.** Firms that reorganize a current firm, rename a firm, or create a new firm, within which at least one of the prior CPA owners remains an owner or employee, shall remain subject to the provisions of this Section. If a firm is merged, combined, dissolved, or separated, the sponsoring organization shall determine which resultant firm shall be considered the succeeding firm. The succeeding firm shall retain its peer review status and the review due date.

**Historical Note**

Adopted effective July 1, 1983 (Supp. 83-4). Repealed effective November 20, 1998 (Supp. 98-4). New Section made by final rulemaking at 10 A.A.R. 4352, effective December 4, 2004. Amended by final rulemaking at 12 A.A.R. 2823, effective September 9, 2006 (Supp. 06-3). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-455. Professional Conduct and Standards**

- A.** It is the Board's policy that the rules governing registrants be consistent with the rules governing the accounting profession generally. Except as otherwise set forth in these regulations, registrants shall conform their conduct to the Code of Professional Conduct, published June 1, 2021 in the AICPA Professional Standards by the American Institute of Certified Public Accountants, 220 Leigh Farm Road, Durham, North Carolina 27707-8110 (www.aicpa.org), available from the AICPA.
- B.** The AICPA Code of Professional Conduct, and any interpretations and ethical rulings by the issuing body, shall apply to all registrants, including those who are not members of the AICPA. The version specified above, including any interpretations and ethical rulings in effect shall apply. Any later amendments, additions, interpretations, or ethical rulings shall not apply.

**Historical Note**

Former Rule 9; Amended effective January 15, 1976 (Supp. 76-1). Amended effective January 3, 1977 (Supp. 77-1). Amended effective February 22, 1978 (Supp. 78-1). Amended effective November 5, 1980 (Supp. 80-6). Former Section R4-1-56 renumbered as Section R4-1-455 and amended in subsections (B) and (D) effective July 1, 1983 (Supp. 83-4). Section R4-1-455 amended and divided into R4-1-455 and R4-1-455.01 thru R4-1-455.04 effective April 22, 1992 (Supp. 92-2). Amended effective December 6, 1995 (Supp. 95-4). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1). Amended by final rulemaking at 27 A.A.R. 921, effective August 1, 2021 (Supp. 21-2). Amended by final rulemaking at 28 A.A.R. 1106 (May 27, 2022), effective July 3, 2022 (Supp. 22-2).

**R4-1-455.01. Professional Conduct: Definitions; Interpretations**

Interpretation of definitions: All terms defined in A.R.S. § 32-701 et seq. shall be construed, to the extent possible, to be consistent with corresponding definitions in the professional standards adopted in R4-1-455. The foregoing notwithstanding, for purposes of R4-1-455 and the professional standards adopted therein references to "member" shall be to "registrant" as defined in A.R.S. § 32-701.

**Historical Note**

Section R4-1-455.01 renumbered from R4-1-455(B) and amended effective April 22, 1992 (Supp. 92-2). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1).

**R4-1-455.02. Professional Conduct: Competence and Technical Standards**

- A.** In reporting on financial statements for which a registrant has performed attest services (as defined in A.R.S. § 32-701) any of the following will constitute a violation of A.R.S. § 32-741(A)(4):
1. In an audit engagement, failing to:
    - a. Prepare audit documentation that is sufficient to enable an experienced auditor, having no previous connection with the audit, to understand:

## CHAPTER 1. BOARD OF ACCOUNTANCY

- i. The nature, timing, and extent of the audit procedures performed;
  - ii. The results of the audit procedures performed, and the audit evidence obtained; and
  - iii. Significant findings or issues arising during the audit, the conclusions reached thereon, and significant professional judgments made in reaching those conclusions;
- b. Obtain sufficient appropriate evidence to conclude that the financial statements taken as a whole are free from material misstatement; or
- c. Modify the opinion in the auditor's report when:
- i. The financial statements as a whole are materially misstated; or
  - ii. Sufficient appropriate audit evidence to conclude that the financial statements as a whole are free from material misstatement has not been obtained.
2. In a review engagement, failing to:
- a. Accumulate sufficient review evidence to provide a reasonable basis for obtaining limited assurance that there are no material modifications that should be made to the financial statements in order to be in conformity with the applicable financial reporting framework; or
  - b. Modify the accountant's review report for a departure from the applicable financial reporting framework, including inadequate disclosure, that is material to the financial statements.
3. In an examination of prospective financial statements engagement, failing to:
- a. Obtain sufficient evidence to provide a reasonable basis for the conclusion that is expressed in the report; or
  - b. Modify the report when:
    - i. One or more significant assumptions do not provide a reasonable basis for the prospective financial statements; or
    - ii. The examination is affected by conditions that preclude application of one or more procedures considered necessary in the circumstances.
- B.** The provisions of this subsection are not intended to be all inclusive or to limit the application of A.R.S. § 32-741(A)(4).

**Historical Note**

Section R4-1-455.02 renumbered from R4-1-455(C) and amended effective April 22, 1992 (Supp. 92-2). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4).

**R4-1-455.03. Professional Conduct: Specific Responsibilities and Practices**

- A.** Discreditable acts: In addition to any other acts prohibited by any standards incorporated in these rules, a registrant shall not commit an act that reflects adversely on the registrant's fitness to engage in the practice of public accounting, including and without limitation:
1. Violating a provision of R4-1-455, R4-1-455.01, R4-1-455.02, R4-1-455.03 or R4-1-455.04;
  2. Violating a fiduciary duty or trust relationship with respect to any person; or
  3. Violating a provision of A.R.S. Title 32, Chapter 6, Article 3, or this Chapter.
- B.** Advertising practices and solicitation practices: A registrant has violated A.R.S. § 32-741(A)(4) and engaged in dishonest

or fraudulent conduct in the practice of public accounting in connection with the communication or advertising or solicitation of accounting services through any media, if the registrant willfully engages in any of the following conduct:

1. Violates A.R.S. § 44-1522 and a court finds the violation willful;
  2. Engages in fraudulent or misleading practices in the advertising of accounting services that leads to a conviction pursuant to A.R.S. § 44-1481; or
  3. Engages in fraudulent practices in the advertising of accounting services that leads to a conviction for a violation of any other state or federal law.
- C.** Form of practice and name: A registrant shall not use a professional or firm name or designation that is misleading about the legal form of the firm, or about the persons who are partners, officers, members, managers, or shareholders of the firm, or about any other matter. A firm name or designation shall not include words such as "& Company," "& Associates," or "& Consultants" unless the terms refer to additional full-time CPAs that are not otherwise mentioned in the firm name.
- D.** Communications: When requested, a registrant shall file a written response to a communication from the Board within 30 days of the date of the mailing of such communication by certified mail. A written response is deemed filed on the date and time received in the Board office. The Board shall record the date and time either by electronic date stamp in Arizona time or on physical receipt in the Board's office. The Board shall not accept a postmark as evidence of timely filing.
- E.** The provisions of R4-1-455.03(A) through (C) are not intended to be all inclusive or to limit the application of any standards incorporated by R4-1-455.

**Historical Note**

Section R4-1-455.03 renumbered from R4-1-455(D) and amended effective April 22, 1992 (Supp. 92-2). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 12 A.A.R. 2823, effective September 9, 2006 (Supp. 06-3). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 1807, effective June 15, 2017 (Supp. 17-2). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4).

**R4-1-455.04. Professional Conduct: Records Disposition**

Document retention policies. Except as set forth in A.R.S. § 32-744(D), a registrant may retain and dispose of documents prescribed in A.R.S. § 32-744(C) in compliance with a reasonable document retention policy.

**Historical Note**

Section R4-1-455.04 renumbered from R4-1-455(E) and amended effective April 22, 1992 (Supp. 92-2). Section number corrected (Supp. 97-3). Amended effective November 20, 1998 (Supp. 98-4). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 23 A.A.R. 3246, effective January 1, 2018 (Supp. 17-4).

**R4-1-456. Reporting Practice Suspensions and Violations**

- A.** A registrant shall report to the Board:
1. Any suspension or revocation of the right to practice accounting before the federal Securities and Exchange Commission, the Internal Revenue Service, or any other state or federal agency;
  2. Any final judgment in a civil action or administrative proceeding in which the court or public agency makes findings of violations, by the registrant, of any fraud

## CHAPTER 1. BOARD OF ACCOUNTANCY

- provisions of the laws of this state or of federal securities laws;
3. Any final judgment in a civil action in which the court makes findings of accounting violations, dishonesty, fraud, misrepresentation, or breach of fiduciary duty by the registrant;
  4. Any final judgment in a civil action involving negligence in the practice of public accounting by the registrant; and
  5. All convictions of the registrant of any felony, or any crime involving accounting or tax violations, dishonesty, fraud, misrepresentation, embezzlement, theft, forgery, perjury, or breach of fiduciary duty.
- B.** A registrant required to report under subsection (A) shall make the report in the form of a written letter and ensure that the report is received by the Board within 30 days after the entry of any judgment or suspension or revocation of the registrant's right to practice before any agency. The registrant shall ensure that the letter contains the following information:
1. Description of the registrant's activities that resulted in a suspension or revocation;
  2. Final judgment or conviction;
  3. Name of the state or federal agency that restricted the registrant's right to practice;
  4. Effective date and length of any practice restriction;
  5. Case file number of any court action, civil or criminal;
6. Name and location of the court rendering the final judgment or conviction; and
  7. Entry date of the final judgment or conviction.

**Historical Note**

Adopted effective November 5, 1980 (Supp. 80-6). Former Section R4-1-57 renumbered as Section R4-1-456 without change effective July 1, 1983 (Supp. 83-4). Amended effective February 23, 1993 (Supp. 93-1). Amended by final rulemaking at 20 A.A.R. 520, effective February 4, 2014 (Supp. 14-1). Amended by final rulemaking at 26 A.A.R. 339, effective April 5, 2020 (Supp. 20-1).

**Appendix A. Repealed****Historical Note**

Adopted effective February 22, 1978 (Supp. 78-1). Amended effective December 19, 1979 (Supp. 79-6). Editorial correction, Footnote\*\*, Rules reference corrected (Supp. 83-4). Repealed effective May 31, 1991 (Supp. 91-2).

**Appendix B. Repealed****Historical Note**

Adopted effective February 22, 1978 (Supp. 78-1). Repealed effective April 22, 1992 (Supp. 92-2).

32-703. Powers and duties; rules; executive director; advisory committees and individuals

A. The primary duty of the board is to protect the public from unlawful, incompetent, unqualified or unprofessional certified public accountants through certification, regulation and rehabilitation.

B. The board may:

1. Investigate complaints filed with the board or on its own motion to determine whether a certified public accountant has engaged in conduct in violation of this chapter or rules adopted pursuant to this chapter.
2. Establish and maintain high standards of competence, independence and integrity in the practice of accounting by a certified public accountant as required by generally accepted auditing standards and generally accepted accounting principles and, in the case of publicly held corporations or enterprises offering securities for sale, in accordance with state or federal securities agency accounting requirements.
3. Establish reporting requirements that require registrants to report:
  - (a) The imposition of any discipline on the right to practice before the federal securities and exchange commission, the internal revenue service, any state board of accountancy, other government agencies or the public company accounting oversight board.
  - (b) Any criminal conviction, any civil judgment involving negligence in the practice of accounting by a certified public accountant and any judgment or order as described in section 32-741, subsection A, paragraphs 7 and 8.
4. Establish basic requirements for continuing professional education of certified public accountants, except that the requirements shall not exceed eighty hours in any registration renewal period.
5. Adopt procedures concerning disciplinary actions, administrative hearings and consent decisions.
6. Issue to qualified applicants certificates executed for and on behalf of the board by the signatures of the president and secretary of the board.
7. Adopt procedures and rules to administer this chapter.
8. Require peer review pursuant to rules adopted by the board on a general and random basis of the professional work of a registrant engaged in the practice of accounting.
9. Subject to title 41, chapter 4, article 4, employ an executive director and other personnel that it considers necessary to administer and enforce this chapter.
10. Appoint accounting and auditing, tax, peer review, law, certification, continuing professional education or other committees or individuals as it considers necessary to advise or assist the board or the board's executive director in administering and enforcing this chapter. These committees and individuals serve at the pleasure of the board.
11. Take all action that is necessary and proper to effectuate the purposes of this chapter.
12. Sue and be sued in its official name as an agency of this state.
13. Adopt and amend rules concerning the definition of terms, the orderly conduct of the board's affairs and the effective administration of this chapter.
14. Delegate to the executive director the authority to:
  - (a) Approve an applicant to take the uniform certified public accountant examination pursuant to section 32-723.

- (b) Issue a certificate of certified public accountant pursuant to section 32-721.
- (c) Approve an application for firm registration pursuant to section 32-731.
- (d) Approve a registrant's name change and reissue a certificate of certified public accountant due to the name change.
- (e) Approve a registrant's cancellation request pursuant to section 32-730.02.
- (f) Approve a request for retired status pursuant to section 32-730.04.
- (g) Approve reactivation from inactive status or retired status pursuant to section 32-732.
- (h) Approve compliance with peer review requirements pursuant to this section.
- (i) Approve compliance with continuing professional education audits.
- (j) Approve continuing professional education compliance with decisions and orders.
- (k) Terminate decisions and orders based on a registrant's successful completion of all order requirements.
- (l) Approve a request for continuing professional education reciprocity.

C. The board or an authorized agent of the board may:

1. Issue subpoenas to compel the attendance of witnesses or the production of documents. If a subpoena is disobeyed, the board may invoke the aid of any court in requiring the attendance and testimony of witnesses and the production of documents.
2. Administer oaths and take testimony.
3. Cooperate with the appropriate authorities in other jurisdictions in investigation and enforcement concerning violations of this chapter and comparable statutes of other jurisdictions.
4. Receive evidence concerning all matters within the scope of this chapter.

**ARIZONA DEPARTMENT OF TRANSPORTATION**  
Title 17, Chapter 6, Article 1-5



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - FIVE-YEAR REVIEW REPORT

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 12, 2023

**SUBJECT: DEPARTMENT OF TRANSPORTATION**  
Title 17, Chapter 6

---

### Summary

This Five-Year Review Report (5YRR) from the Department of Transportation (Department) relates to rules in Title 17, Chapter 6, Articles 1 through 5, which covers 51 rules, 13 tables, and 4 illustrations relating to the envelope and special permits issued by the Department pursuant to A.R.S. Title 28, Chapter 3, Articles 18 and 19. Specifically, the rules cover the permit requirements, restrictions, and allowances for transporting oversize and overweight vehicles and loads on highways under the jurisdiction of the Department, and provide uniform enforcement procedures, additional vehicle size and weight standards, operational standards, agreements and compacts to facilitate the regional application and administration of vehicle size and weight standards, uniform permit procedures, uniform application forms, and regulations for the operation of oversize and overweight vehicles, including equipment requirements, driver qualification and operating practices, and such other matters as may be pertinent to meet regional needs and to promote an efficient, safe and compatible transportation network.

In the prior 5YRR for these rules, which was approved by the Council in July 2018, the Department proposed to work closely with the Overdimensional Permit Council, local law enforcement personnel, and other representatives of the regulated community to amend these rules by December 31, 2018. The rule amendments were intended to provide further clarification



on existing processes to ensure public safety, corrected outdated information and statutory references, and ensured that the rules were clear, concise, and understandable. Specifically, The Department worked with the Overdimensional Permit Council to improve the rules by consolidating permit types, eliminating permits rendered unnecessary by the consolidation process, updating statutory references, codifying the Department's new online procedures for permit application and issuance, and making the rules more clear, concise, and understandable. The Department completed the course of action indicated in its previous 5YRR by final rulemaking, which became effective on July 8, 2022.

### **Proposed Action**

In the current report, given the recent amendments to the rules in July 2022, the Department does not propose to take any additional action regarding the rules reviewed.

#### **1. Has the agency analyzed whether the rules are authorized by statute?**

The Department cites both general and specific statutory authority for these rules.

#### **2. Summary of the agency's economic impact comparison and identification of stakeholders:**

The rules under review provide the standards that must be followed for the Department to allow the operation of oversize and overweight vehicles or vehicle and load combinations in interstate commerce using any route designated by the Department as part of the State Highway System.

The Department identifies the following as stakeholders: American Association of State Highway and Transportation Officials (AASHTO); Manufactured Housing Institute; American Trucking Association (ATA); National Pilot Car Association (NPCA); Arizona Department of Transportation (ADOT); National Pilot Car Safety Institute; Arizona Department of Public Safety (DPS); Owner Operator Independent Drivers Association (OOIDA); Arizona Trucking Association (AzTA); Pilot/Escort Vehicle Operators (PEVO); commercial transporters requiring oversize and overweight permits; political subdivisions that issue permits to oversize and overweight vehicles operating on local roadways other than the state highway system; Commercial Vehicle Safety Alliance (CVSA), private certified engineering companies; Manufactured Housing Industry of Arizona (MHIA); and Specialized Carrier and Rigging Association (SC&RA).

The Department states that the economic impact of these rules has been the same as estimated in the economic impact statement prepared by the Department when the rules were last amended. Since the Department's last rulemaking, the number of permit types available for online application have increased, and the Department's online permitting system has become a one-stop self-service tool for commercial motor carriers and transporters seeking to obtain the necessary oversize and overweight special permits while also receiving up-to-date validation of routing information and roadway travel restrictions.

3. **Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Department has determined that the benefits of the oversize and overweight envelope and special permit rules in this Chapter far outweigh the costs. The Department indicates the rules enable ease of transport for businesses operating in this state and ensure an appropriate amount of oversight to protect the public safety, facilitate commerce, and protect the public investment in transportation infrastructure

4. **Has the agency received any written criticisms of the rules over the last five years?**

The Department indicates it received no written criticisms of the rules in the last five years.

5. **Has the agency analyzed the rules' clarity, conciseness, and understandability?**

The Department indicates the rules are clear, concise, and understandable.

6. **Has the agency analyzed the rules' consistency with other rules and statutes?**

The Department indicates the rules are consistent with other rules and statutes.

7. **Has the agency analyzed the rules' effectiveness in achieving its objectives?**

The Department indicates the rules are effective in achieving their objectives.

8. **Has the agency analyzed the current enforcement status of the rules?**

The Department indicates the rules are currently enforced as written.

9. **Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Department indicates these rules provide commercial motor vehicle owners, operators, and drivers with reasonable access to all state and federal highways and routes under the jurisdiction of the Department for interstate and intrastate operations subject to numerous federal laws and regulations designed to facilitate commerce and protect the public investment in transportation infrastructure. The Department indicates the following federal regulations are applicable to the subject matter of the rules, but the rules are not more stringent than any applicable federal law: 23 CFR 658, Appendix C of 23 CFR 658, 49 CFR 393.5, 49 CFR 393.11, and Table 1 of 49 CFR 393.11. The Department indicates all transporters subject to these rules are additionally subject to all other federal and state motor carrier safety and hazardous materials regulations currently applicable to all Arizona motor carriers.

Additionally, the Department indicates the rules are subject to review by the U.S. Secretary of Transportation, as provided under 49 U.S.C. 31141, Review and Preemption of State Laws and Regulations. If the U.S. Secretary of Transportation decides that a state law or regulation is less stringent than a regulation prescribed by the Secretary under 49 U.S.C. 31136, the state law or regulation may not be enforced. However, the “grandfather” provisions in the Federal-Aid Highway Act amendments of 1974, allow the Department to continue issuing special permits using the less stringent maximum permitted weight computations provided under R17-6-411, and Tables 3.01 through 3.09, for movement of a non-reducible vehicle or load under these rules since the Tables were enacted prior to the date of enactment of the Federal-Aid Highway Amendments of 1974 and yield higher weights for groups of axles spaced within 3 feet 5 inches and 18 feet. The Department’s axle spacing Tables are an expansion of the Federal Bridge Formula B weights authorized by the Federal Highway Administration and A.R.S. § 28-1100 for use on the National Highway System and are used by the trucking industry for determining the axle spacing needed to appropriately distribute excess weight across multiple groups of axles.

**10. For rules adopted after July 29, 2010, do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

Pursuant to A.R.S. § 41-1037(A), if an agency proposes an amendment to an existing rule that requires the issuance of a regulatory permit, license, or agency authorization, the agency shall use a general permit, as defined by A.R.S. § 41-1001(11), if the facilities, activities or practices in the class are substantially similar in nature unless certain exceptions apply.

The Department indicates each special permit or envelope permit provided by the Department under these rules is specifically authorized by statute and falls within the criteria provided under A.R.S. § 41-1037.

The Department indicates the oversize, overweight, or oversize and overweight special permits issued under these rules are “general permits” in that each permittee issued a particular class of permit is subject to the same activities, practices, requirements, and restrictions applicable to that permit type.

The Department indicates the envelope permits issued under these rules are “general permits” in that each permittee issued an envelope permit is subject to the same activities, practices, requirements, and restrictions applicable to all other envelope permit holders. The Department’s envelope permits can only be issued for non-reducible loads meeting the strict envelope dimensional criteria provided under A.R.S. § 28-1141, which allows motor carrier transporters unlimited trips and load changes within the permit’s validity period, restricts operation to certain routes, and excludes the transporting of a mobile home.

**11. Conclusion**

This 5YRR from the Department relates to rules in Title 17, Chapter 6, Articles 1 through 5, which covers 51 rules, 13 tables, and 4 illustrations relating to the envelope and special

permits issued by the Department pursuant to A.R.S. Title 28, Chapter 3, Articles 18 and 19. The Board indicates that the rules, as recently amended in July 2022, are clear, concise, understandable, consistent, effective, and enforced as written. As such, the Department does not propose to take any action regarding these rules.

Council staff recommends approval of this report.

Director's Office

Katie Hobbs, Governor

Jennifer Toth, Director

Kismet Weiss, Deputy Director/Chief Operating Officer

Gregory Byres, Deputy Director for Transportation/State Engineer

March 27, 2023

VIA EMAIL: [grrc@azdoa.gov](mailto:grrc@azdoa.gov)

Ms. Nicole Sornsin, Chair  
Governor's Regulatory Review Council  
100 N. 15th Ave., Suite 305  
Phoenix, AZ 85007

Re: Five-year Review Report on 17 A.A.C. 6, Articles 1 through 5: Oversize and Overweight Envelope and Special Permits

Dear Ms. Sornsin:

The Arizona Department of Transportation submits for Council review and approval the accompanying Five-year Review Report for 17 A.A.C. Chapter 6, Articles 1 through 5. This document complies with all requirements provided under A.R.S. § 41-1056 and A.A.C. R1-6-301. Additionally, the Department certifies full compliance with the requirements provided under A.R.S. § 41-1091.

For information regarding the report, please communicate directly with John Lindley, Senior Rules Analyst, at (480) 267-6543.

Sincerely,



Jennifer Toth  
Director

Enclosure



**Government Relations and Policy  
Development Office**

**Administrative Rules  
Five-Year Review Report**

**A.A.C. Title 17 – Transportation  
Chapter 6. Department of Transportation  
Oversize and Overweight Special Permits**

**Article 1. General Provisions  
Article 2. Special Permit Classes and Fees  
Article 3. Safety Requirements  
Article 4. Transport Provisions  
Article 5. Envelope Permit Special Provisions**

***Katie Hobbs***

***Jennifer Toth***

***Governor***

***ADOT Director***

Submitted to the Governor's Regulatory Review Council  
March 2023

**Arizona Department of Transportation  
Five-year Review Report**

**17 A.A.C. Chapter 6, all Articles**

**Table of Contents**

	<u>Section</u>
Report Summary	A
Five-year Review Report	B
Analysis of Individual Rules	
Identical Information within Rule Groups	
Rule Text	C
Statutory Authority, Definitions, and Other Applicable Rules	D
Economic, Small Business, and Consumer Impact Statement	E

**Arizona Department of Transportation**

**Five-year Review Report**

**17 A.A.C. Chapter 6, All Articles**

**Section A**

**Report Summary**



**Arizona Department of Transportation**  
**Five-year Review Report**  
**17 A.A.C. Chapter 6, All Articles**

**Report Summary**

The Director of the Department of Transportation (Department) has broad authority under A.R.S. §§ 28-366 and 28-7045 to adopt rules for collection of taxes and license fees, public safety and convenience, enforcement of the provisions of the laws the Director administers or enforces, and for exercising complete and exclusive operational control and jurisdiction over the use of state highways and routes on the State Highway System, including the Interstate highways, to prevent the abuse and unauthorized use of those highways and routes.

This five-year review report covers 51 rules, 13 Tables, and 4 Illustrations in Chapter 6, Articles 1 through 5, relating to the envelope and special permits issued by the Department pursuant to A.R.S. Title 28, Chapter 3, Articles 18 and 19. The Department and the Overdimensional Permit Council have developed these rules in coordination with a broad coalition of public and private transportation stakeholder groups including the Department of Public Safety (DPS), local law enforcement personnel, Arizona's business community, the Arizona Trucking Association, the Specialized Carriers & Rigging Association and other members of Arizona's trucking, heavy-haul transport, crane, utility, and escort vehicle industries.

The Department believes that these rules reflect reasonable permit requirements, restrictions, and allowances for transporting oversize and overweight vehicles and loads on highways under the jurisdiction of the Department, while providing uniform enforcement procedures, additional vehicle size and weight standards, operational standards, agreements and compacts to facilitate the regional application and administration of vehicle size and weight standards, uniform permit procedures, uniform application forms, and regulations for the operation of oversize and overweight vehicles, including equipment requirements, driver qualification and operating practices, and such other matters as may be pertinent to meet regional needs and to promote an efficient, safe and compatible transportation network.

The Department completed all updates promised in its previous five-year review report on these rules by final rulemaking at [28 A.A.R. 1263, effective July 8, 2022](#). The Department worked with the Overdimensional Permit Council to improve the rules by consolidating permit types, eliminating permits rendered unnecessary by the consolidation process, updating statutory references, codifying the Department's new online procedures for permit application and issuance, and making the rules more clear, concise, and understandable. Therefore, at this time, the Department proposes no immediate action for any of the rules located under this Article.

**Arizona Department of Transportation**

**Five-year Review Report**

**17 A.A.C. Chapter 6, all Articles**

**Section B**

**Analysis of Individual Rules and**

**Identical Information within Rule Groups**

**Governor’s Regulatory Review Council  
Five-Year-Review Report  
Arizona Department of Transportation  
17 A.A.C. Chapter 6, all Articles**

**1. Authorization of the rule by existing statutes**

General Statutory Authority:

A.R.S. Title 28, Chapter 3, Articles 18 and 19, 23 CFR 657, 49 CFR 393, 23 U.S.C. 127 and 42 U.S.C. 5121

Specific Statutory Authority:

A.R.S. §§ 28-363, 28-366, 28-1095, 28-1103, 28-1104, 28-1105, 28-1111, 28-1142, 28-1144, 28-1146, 28-1150, 28-5204, 28-7045, 42-19157 and 23 CFR 658

**2. The objective of each rule:**

These rules provide the standards that must be followed for the Department to allow the operation of oversize and overweight vehicles or vehicle and load combinations in interstate commerce using any route designated by the Department as part of the State Highway System.

**Article 1. General Provisions**

R17-6-101	To inform industry and the motoring public that the Department, working in collaboration with the Overdimensional Permit Council as prescribed under A.R.S. § 28-1150(C)(3), requires and issues envelope and special permits as provided under A.R.S. Title 28, Chapter 3, Articles 18 and 19, and this Chapter, to authorize the safe and efficient movement of certain oversize and/or overweight vehicles or vehicle and load combinations transporting on the State Highway System. Additionally, this rule provides definitions for terms used throughout the Chapter.
R17-6-102	To inform industry and the motoring public of the dimensional thresholds and maximum limits at which a vehicle or vehicle and load combination is considered legal for transport on the State Highway System without having to obtain an oversize, overweight, or oversize and overweight envelope or special permit from the Department. Additionally, this rule provides information regarding movement of equipment without a special permit for the purpose of repair or local operation and further clarifies the types of vehicles or vehicle and load combinations statutorily exempt from the special permit requirements of this Chapter.
Table 1	To provide oversize and overweight envelope and special permit applicants a quick reference chart detailing all applicable size and weight limitations prescribed by statute, above which point the Department will require application for and issuance of an oversize, overweight, or oversize and overweight envelope or special permit before commencement of travel using any route designated by the Department as part of the State Highway System.

R17-6-103	To inform oversize and overweight special permit applicants of the methods of application available and the documents required to be submitted to the Department for issuance of a special permit authorizing movement of an oversize and overweight vehicle or load on any part of the State Highway System.
R17-6-104	To inform class C oversize and overweight special permit applicants of the additional documentation required to be submitted to the Department for issuance of a class C oversize and overweight special permit authorizing movement of an oversize, overweight, or oversize and overweight vehicle or vehicle and load combination that requires special consideration or extra precaution, on a case by case basis, due to the unique size and/or weight of the vehicle or vehicle and load combination.
R17-6-105	To inform oversize and overweight special permit applicants that a permit issued by the Department under this Chapter is valid only for movement of an oversize, overweight, or oversize and overweight vehicle or vehicle and load combination traveling on any part of the State Highway System. A special permit applicant must apply separately with other applicable political subdivisions or tribal nations for permission to operate on any county, municipal, or tribal route.
R17-6-106	To provide oversize and overweight special permit applicants with information regarding the availability of a permit extension that can be granted by the Department as provided under this Section in the event of certain unavoidable circumstances inhibiting a permit holders ability to move an oversize or overweight vehicle or load as initially planned.
R17-6-107	To inform oversize and overweight special permit holders of the authority of law enforcement personnel to confiscate an oversize or overweight special permit issued by the Department before its expiration date if the vehicle operator is found to be in violation of a provision of this Chapter or A.R.S. Title 28, Chapter 3, Article 18.
R17-6-108	To provide class C special permit applicants with information regarding the Department's process for determining whether the movement of an oversize and/or overweight vehicle, or vehicle and load combination, may involve a potential traffic safety risk warranting the preparation and submission of a comprehensive traffic control plan as a condition of permit approval. This rule provides the industry and the general public with the specific criteria the Department will use when making such a determination.
R17-6-109	To provide oversize and overweight special permit applicants with information regarding the specific criteria used by the Department to deny an oversize or overweight special permit application, or to revoke and confiscate a previously issued oversize or overweight special permit.

R17-6-110	To inform oversize and overweight special permit holders and drivers of their statutory liability for any damage caused to a state highway or highway structure while moving an oversize or oversize and overweight vehicle or load.
R17-6-111	To inform oversize and overweight special permit holders of their right to request a hearing with the Department's administrative hearing office to appeal the Department's decision to deny, confiscate, or revoke an oversize and overweight special permit or application.
R17-6-112	To provide oversize and overweight vehicle operators with information regarding the Director's ability to authorize certain movement of oversize and overweight vehicles and load combinations without a special permit for purposes of relief or repair in times of an emergency affecting public welfare or safety.
R17-6-113	To provide the Department's process for ensuring that a local authority's current ordinances and rules relating to the issuance of oversize or overweight special permits are made available to the public electronically as required under A.R.S. §§ 28-1103(F) and (G).

**Article 2. Special Permit Classes and Fees**

R17-6-201	To provide oversize and overweight special permit applicants with a quick reference chart reflecting the statutorily prescribed fees and the size and weight thresholds used by the Department to determine eligibility for the Class A oversize or overweight special permits.
R17-6-203	To provide commercial transporters of recreational vehicles with a quick reference chart reflecting the statutorily prescribed fees and the size threshold used by the Department to determine eligibility for issuance of an annual or 30-day Class A - Oversize Recreational Vehicle special permit.
R17-6-205	To provide oversize and overweight special permit applicants with information regarding the size and weight thresholds used by the Department, and the additional information required by the Department, to determine eligibility for continuous travel under the annual or 30-day Class A - Crane special permit used for transporting specific non-reducible self-propelled mobile cranes, drilling rigs, or similar oversize and overweight specialty equipment.
R17-6-206	To provide longer combination vehicle operators with the Department's established criteria for issuance of the Class E oversize or overweight special permits allowing reasonable access for longer combination vehicles traveling on certain designated routes.
Table 2	To provide longer combination vehicle operators with a quick reference chart reflecting the statutorily prescribed fees and the size and weight thresholds used by the Department to determine eligibility for the Class E oversize or overweight special permits.

R17-6-207	To provide oversize and overweight special permit applicants with information regarding the Department's ability to suspend length and weight limitations on certain state routes and highways when the removal of timber or natural forest products is necessary in support of certain healthy forest initiatives.
R17-6-209	To provide oversize and overweight special permit applicants with a quick reference chart reflecting the statutorily prescribed fee and the size and weight threshold used by the Department to determine eligibility for the annual Class A - Overwidth Watercraft special permit.
R17-6-210	To provide the application procedure and other criteria needed by an oversize and overweight houseboat transporter to obtain an appropriate route specific oversize and overweight special permit.
Table 5	To provide the Page-Lake Powell area highway routes applicable to the provisions of oversize and overweight houseboat movement under R17-6-210.
R17-6-211	To provide oversize and overweight special permit applicants with the application procedure and a quick reference chart reflecting the statutorily prescribed fees and the size and weight thresholds used by the Department to determine eligibility for the Class C oversize or overweight special permits.
R17-6-212	To provide oversize and overweight vehicle operators and transport industry representatives with information regarding the availability of special permits authorizing transport of a vehicle or vehicle and load combination that uses extra axles to achieve higher weights of up to 60,000 lbs. per tridem axle group.

### **Article 3. Safety Requirements**

R17-6-301	To inform oversize and overweight special permit holders of their statutory obligation to observe all applicable safety requirements for motor carriers operating in Arizona as prescribed under 49 CFR as incorporated by reference under A.A.C. R17-5-202 through R17-5-209.
R17-6-302	To inform permittees and drivers of their lawful obligation to ensure appropriate placement of warning flags on overwidth and overlength vehicles or vehicle and load combinations before commencing transport on the State Highway System.
Ill. 1	To illustrate appropriate placement of warning flags on overwidth and overlength vehicles or vehicle and load combinations before commencing transport on the State Highway System.
R17-6-303	To inform oversize and overweight vehicle operators of their obligation to ensure that an oversize and overweight special permitted vehicle and load combination displays an appropriate "OVERSIZE LOAD" sign as applicable for travel on a state highway under the jurisdiction of the Department.

III. 2	To inform oversize and overweight vehicle operators of the applicable specifications for the “OVERSIZE LOAD” sign required by the Department to be displayed on an oversize and overweight special permitted vehicle and load combination for travel on a state highway under the jurisdiction of the Department.
R17-6-304	To inform oversize and overweight vehicle operators of their obligation to ensure that an oversize and overweight special permitted vehicle and load combination displays appropriate lighting for travel on a state highway under the jurisdiction of the Department.
III. 4	To provide oversize and overweight special permit applicants with examples of the typical warning light configurations required by law for the safe transport of any load with excessive width or overhang on a highway under the jurisdiction of the Department.
R17-6-305	To inform oversize and overweight special permit holders of the Department’s criteria for determining, and their obligation to ensure, appropriate escort accompaniment while transporting an oversize and overweight vehicle and load combination on a state highway under the jurisdiction of the Department. This rule also provides requirements to be followed by all escort vehicle operators involved with transporting the permitted vehicle or load.
R17-6-306	To inform oversize and overweight special permit holders of the process for requesting law enforcement escorts when required by the Department to provide additional traffic control while transporting certain oversize and overweight vehicles or vehicle and load combinations on a state highway under the jurisdiction of the Department.
R17-6-307	To inform oversize and overweight special permit holders of their obligation to ensure that a load projecting from an oversize and overweight vehicle and load combination remains within acceptable limits while transporting on a state highway under the jurisdiction of the Department.
R17-6-308	To inform overheight special permit holders of their obligation to ensure appropriate communication with all applicable utility companies before attempting to transport certain overheight vehicle and load combinations.

**Article 4. Transport Provisions**

R17-6-401	To provide oversize and overweight special permit holders with information regarding general transport restrictions and the specific criteria used by the Department to determine an applicant’s eligibility to receive an oversize or overweight vehicle envelope or special permit allowing continuous travel on a state highway under the jurisdiction of the Department.
R17-6-402	To provide oversize and overweight special permit holders with information regarding the specific criteria used by the Department to determine an applicant’s eligibility to receive an oversize or overweight vehicle special permit allowing night or weekend travel on a state highway under the jurisdiction of the Department.

R17-6-403	To inform oversize and overweight special permit holders of their obligation to ensure that oversize and overweight vehicle and load combinations exceeding certain dimensions are not moved on a state highway under the jurisdiction of the Department on a holiday as prescribed under this Section.
R17-6-404	To inform oversize and overweight special permit holders of their obligation to ensure that movement of certain oversize and overweight vehicle and load combinations does not take place during rush hour on any route specifically designated under this Section.
R17-6-405	To inform oversize and overweight special permit holders of their obligation to ensure that travel on state highways under the jurisdiction of the Department does not occur during any unsafe condition provided under this Section.
R17-6-407	To inform oversize and overweight special permit holders of their obligation to ensure that oversize and overweight vehicle and load combinations within certain dimensions are not moved on a state highway under the jurisdiction of the Department on a Saturday or Sunday.
R17-6-409	To inform oversize and overweight special permit holders of a weekend and holiday transport restriction exception applicable only for the movement of certain oversize and overweight vehicle and load combinations transporting personal watercraft within specific dimensions, and on designated routes, as specifically prescribed under this Section.
R17-6-410	To provide a quick size and weight reference chart and other criteria for transporters towing manufactured homes.
R17-6-411	To provide information for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the appropriate axle spacing necessary for excess weight distribution across multiple groups of axles. The Department's axle spacing Tables are an expansion of the Federal Bridge Formula B weights authorized by the Federal Highway Administration and A.R.S. § 28-1100 for use on the National Highway System.
Ill. 3	To provide a quick reference chart for Department and oversize and overweight special permit applicants to use in determining the maximum allowable weight computations of a given axle group.
Table 3.01	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>8' 0"</u> in width.
Table 3.02	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>8' 3"</u> in width.



Table 3.03	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>8' 6"</u> in width.
Table 3.04	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>8' 9"</u> in width.
Table 3.05	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>9' 0"</u> in width.
Table 3.06	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>9' 3"</u> in width.
Table 3.07	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>9' 6"</u> in width.
Table 3.08	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>9' 9"</u> in width.
Table 3.09	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers to determine the maximum allowable weight computations for a group of axles <u>10'</u> in width.
R17-6-412	To provide information regarding the Department's process for imposing temporary restrictions or requirements on the movement of an oversize or overweight special permitted vehicle or load if transport is unavoidably affected by a temporary construction or maintenance project, incident, or emergency situation. This rule also outlines the ongoing responsibility of the permit holder and driver to review the Department's website for any temporary restrictions prior to transporting any oversize or overweight vehicle or load on the state highway system.
Table 4	To provide a quick reference chart for use by oversize and overweight special permit applicants, Department personnel, and law enforcement officers for use in determining what permanent highway restrictions are applicable to each specific route.

**Article 5. Envelope Permit Special Provisions**

R17-6-501	To inform industry and the motoring public of the general provisions and definitions used by the Department when issuing and regulating the use of envelope permits under this Chapter.
-----------	---

R17-6-502	To provide oversize and overweight envelope permit applicants with general information and a quick reference chart reflecting the statutorily prescribed fees and the size and weight thresholds used by the Department to determine eligibility for issuance of an oversize and/or overweight envelope permit.
R17-6-503	To inform oversize and overweight envelope permit applicants of the methods of application available, and the documents required, for issuance of an envelope permit authorizing movement of an oversize and overweight vehicle or load on any part of the State Highway System.
R17-6-504	To provide oversize and overweight vehicle operators and transport industry representatives with information regarding the availability of envelope permits authorizing transport of a vehicle or vehicle and load combination that uses extra axles to achieve higher weights of up to 60,000 lbs. per tridem axle group.
R17-6-505	To provide the process each envelope permit holder must use to notify the Department and obtain a trip authorization number before using an annual envelope permit to transport a vehicle or vehicle and load combination using a tridem axle group configuration, as authorized under R17-6-212, to achieve a maximum permitted weight of 60,000 pounds per tridem axle group.
R17-6-506	To provide houseboat haulers operating within 10 miles of the Page-Lake Powell area with information regarding the availability, application, and issuance requirements for envelope permits authorizing transport of vehicles hauling houseboats under A.R.S. § 28-1144(B).
R17-6-507	To prescribe the specific records an envelope permit holder is required to retain and make available to the Department, or a state or local peace officer, for inspection as provided under A.R.S. § 28-1149.
R17-6-508	To provide envelope permit holders with additional information regarding the Department's process for assigning points for envelope permit violations as prescribed under A.R.S. § 28-1147.
R17-6-509	To provide envelope permit holders with additional information regarding the Department's process for initiating suspension and revocation of envelope permits as prescribed under A.R.S. § 28-1147.
R17-6-510	To provide envelope permit holders with additional information regarding the Department's process for notifying the permit holder for point assessment, denial, suspension, or revocation of an envelope permit and provide notice of the permit holder's right to a hearing as prescribed under A.R.S. § 28-1147.
R17-6-511	To provide envelope permit holders with additional information regarding the permit holder's eligibility to reapply for an envelope permit after a denial or revocation.

3. **Are the rules effective in achieving their objectives?** Yes  No

*If not, please identify the rule(s) that is not effective and provide an explanation for why the rule(s) is not effective.*

Rule	Explanation
N/A	N/A

4. **Are the rules consistent with other rules and statutes?** Yes  No   
*If not, please identify the rule(s) that is not consistent. Also, provide an explanation and identify the provisions that are not consistent with the rule.*

Rule	Explanation
N/A	N/A

5. **Are the rules enforced as written?** Yes  No   
*If not, please identify the rule(s) that is not enforced as written and provide an explanation of the issues with enforcement. In addition, include the agency's proposal for resolving the issue.*

Rule	Explanation
N/A	N/A

6. **Are the rules clear, concise, and understandable?** Yes  No   
*If not, please identify the rule(s) not clear, concise, or understandable and provide an explanation as to how the agency plans to amend the rule(s) to improve clarity, conciseness, and understandability.*

Rule	Explanation
N/A	N/A

7. **Has the agency received written criticisms of the rules within the last five years?** Yes  No   
*If yes, please fill out the table below:*

Commenter	Comment	Agency's Response
N/A	N/A	N/A

8. **Economic, small business, and consumer impact comparison:**  
 The economic impact of these rules has been the same as estimated in the economic impact statement prepared by the Department when the rules were last amended. Since the Department's last rulemaking, the number of permit types available for online application have increased, and the Department's online permitting system has become a one-stop self-service tool for commercial motor carriers and transporters seeking to obtain the necessary oversize and overweight special permits while also receiving up-to-date validation of routing information and roadway travel restrictions.

Stakeholder groups having an interest in these rules include:

American Association of State Highway and Transportation Officials (AASHTO)	Manufactured Housing Institute
---	--------------------------------

American Trucking Association (ATA)	National Pilot Car Association (NPCA)
Arizona Department of Transportation (ADOT)	National Pilot Car Safety Institute
Arizona Department of Public Safety (DPS)	Owner Operator Independent Drivers Association (OOIDA)
Arizona Trucking Association (AzTA)	Pilot/Escort Vehicle Operators (PEVO)
Commercial transporters requiring oversize and overweight permits	Political subdivisions that issue permits to oversize and overweight vehicles operating on local roadways other than the state highway system
Commercial Vehicle Safety Alliance (CVSA)	Private certified engineering companies
Manufactured Housing Industry of Arizona (MHIA)	Specialized Carrier and Rigging Association (SC&RA)

In calendar year 2017, the Department issued 160,789 oversize and overweight envelope and special permits through its online permitting system, which generated \$ 8,230,002 in revenue for the State Highway Fund. In calendar year 2022, the Department issued 126,502 oversize and overweight envelope and special permits, which generated \$ 8,538,930 in revenue for the State Highway Fund:

<b>Permit Classification</b>	<b>CY 2017 # Permits Issued</b>	<b>CY 2017 State Highway Fund</b>	<b>CY 2022 # Permits Issued</b>	<b>CY 2022 State Highway Fund</b>
30 Cranes (Class D)	264	\$ 19,725	445	\$ 33,225
30 Day Envelope Houseboat	0	\$ 0	0	\$ 0
30 Day Envelope OS	27	\$ 2,850	44	\$ 6,300
30 Day Envelope OS/OW	5	\$ 1,000	9	\$ 4,000
30 Day General Class A OS	6,321	\$ 187,800	7,454	\$ 234,390
30 Day General OS/OW Class A	5,474	\$ 404,475	5,347	\$ 412,575
30 Day General Use	44,290	\$ 660,300	0	\$ 0
30 Day LCV Category B	2	\$ 150	6	\$ 450
30 Day LCV Category C	258	\$ 18,525	126	\$ 9,075

30 Day LCV Category D	675	\$ 49,650	467	\$ 34,575
30 Day OS Only RV (Class B Type R)	1,143	\$ 33,990	3,009	\$ 89,700
30 Day Only Excluding Cranes and Drilling (Class B)	9	\$ 270	10	\$ 300
30 Day OW I-19 83,000	0	\$ 0	0	\$ 0
Annual Cranes (Class D)	210	\$ 114,025	293	\$ 157,800
Annual Envelope Houseboat	18	\$ 18,000	11	\$ 16,500
Annual Envelope OS	288	\$ 166,350	409	\$ 231,325
Annual Envelope OS/OW	876	\$ 865,725	1,188	\$ 1,135,925
Annual Envelope Tridem (Class C)	N/A	N/A	18	\$ 25,500
Annual LCV Category A	0	\$ 0	0	\$ 0
Annual LCV Category B	18	\$ 5,760	9	\$ 2,880
Annual LCV Category C	894	\$ 310,320	1,197	\$ 421,920
Annual LCV Category D	474	\$ 237,600	561	\$ 283,800
Annual OS Only RV (Class B Type R)	182	\$ 64,800	151	\$ 53,280
Annual Only Excluding Cranes and Drilling (Class B)	56	\$ 14,760	62	\$ 18,000
Annual Watercraft (Class H)	77	\$ 3,195	74	\$ 3,330
Class G 30 Day	1	\$ 30	3	\$ 90
Class G Annual	0	\$ 0	0	\$ 0
Class G Single Trip	21	\$ 315	4	\$ 60

Single Trip General OS Class A	28,504	\$ 423,885	28,772	\$ 424,650
Single Trip General OS Class C	1,251	\$ 36,550	1,505	\$ 44,465
Single Trip General OS/OW Class A	10,360	\$ 766,725	12,342	\$ 908,175
Single Trip General OS/OW Class C	2,483	\$ 262,978	3,540	\$ 302,210
Single Trip Houseboat	43	\$ 4,300	0	\$ 0
Single Trip LCV Category B	0	\$ 0	0	\$ 0
Single Trip LCV Category C	27	\$ 1,875	12	\$ 900
Single Trip LCV Category D	7	\$ 525	6	\$ 375
Single Trip Max Tridem OS/OW Class C	969	\$ 86,025	3,822	\$ 334,620
Single Trip Mobile Home Easy C	2,030	\$ 60,645	3,024	\$ 89,970
Single Trip Mobile Home OS Class A	8,965	\$ 133,905	10,221	\$ 152,970
Single Trip Mobile Home OS Class C	179	\$ 5,150	181	\$ 5,365
Single Trip Border OW Produce 90,800 lbs.	44,385	\$ 3,267,601	42,180	\$ 3,100,230
Single Trip Western Regional OS/OW	3	\$ 223	N/A	N/A
<b>Totals</b>	<b>160,789</b>	<b>\$ 8,230,002</b>	<b>126,502</b>	<b>\$ 8,538,930</b>

Additionally, the Manufactured Housing Institute, a national trade organization representing the factory-built housing industry, recently reported that shipments from Arizona's five manufacturing plants reached 2,421 units in Calendar Year 2022 (Source: [Institute for Building Technology and Safety \(IBTS\)](#)), which represents a significant increase as compared to the 1,721 units reportedly shipped in Calendar Year 2017. The oversize and overweight special permits issued by the Department under these rules support the economical movement of mobile homes

across the state and enable Arizona's five manufacturing plants to sell and deliver factory-built manufactured housing in support of higher profitability and job growth.

In addition to the significant economic benefits enjoyed by the manufacturers, the process of safely and efficiently moving oversize and overweight manufactured homes or factory-built buildings often requires services provided by other industry partners, such as traffic engineering and planning firms or escort vehicle operators.

9. **Has the agency received any business competitiveness analyses of the rules?** Yes \_\_\_ No X

10. **Has the agency completed the course of action indicated in the agency's previous five-year-review report?**  
Yes X No \_\_\_ *Please state what the previous course of action was and if the agency did not complete the action, please explain why not.*

The Department's previously stated course of action involved working closely with the Overdimensional Permit Council, local law enforcement personnel, and other representatives of the regulated community to amend these rules by December 31, 2018. The rule amendments provided further clarification on existing processes to ensure public safety, corrected outdated information and statutory references, and ensured that the rules were clear, concise, and understandable.

The Department completed the course of action indicated in its previous five-year review report by final rulemaking at [28 A.A.R. 1263, effective July 8, 2022](#).

11. **A determination that the probable benefits of the rule outweigh within this state the probable costs of the rule, and the rule imposes the least burden and costs to persons regulated by the rule, including paperwork and other compliance costs necessary to achieve the underlying regulatory objectives:**

To mitigate possible hazards and inconveniences, the Department has specific statutory authority to require the application for, and issuance of, an envelope or special permit before moving an oversize or overweight vehicle, combination of vehicles, or vehicle and load combination on or over any route designated by the Department as part of the State Highway System.

The rules in this Chapter were developed by the Department to promote an efficient, safe, and compatible regional transportation network in support of the unique regional and economic needs of Arizona, and must be followed for the Department to allow oversize and overweight vehicles or vehicle and load combinations to operate in interstate commerce using any part of the State Highway System.

Additionally, the Department believes that these rules:

- a. Are consistent with and in recognition of the generally accepted principles of highway safety, traffic congestion reduction, and air quality enhancement;
- b. Support the most efficient and environmentally sound principles of operation for oversize and overweight vehicles and loads transported on the State Highway System; and

- c. Support the industry goals of increasing productivity and lowering fuel consumption and related transportation costs.

Many of the rule amendments made by the Department at [28 A.A.R. 1263, effective July 8, 2022](#), support the recent expansion of the Department's online permitting system. Previously, oversize and overweight permits were only available from Arizona ports of entry and the Department's two central permitting offices. However, because the Department's antiquated permitting processes required that a Department employee always be available to complete the permitting process, permit holders were not always able to receive real-time information on routing or roadway travel restrictions, which sometimes led to unplanned, unnecessary, and costly delays in travel for all highway users.

The Department has determined that the benefits of the oversize and overweight envelope and special permit rules in this Chapter far outweigh the costs. The rules enable ease of transport for businesses operating in this state and ensure an appropriate amount of oversight to protect the public safety, facilitate commerce, and protect the public investment in transportation infrastructure.

The rules now contain the Department's issuance criteria for class A special permits to accommodate all vehicles, or vehicle and load combinations, previously only eligible for a class B, class B-Type R, class D, or class G special permit. The Department's recent efforts to streamline and reduce all permit application processes by better utilizing technology has resulted in the modernization of all permitting processes, the elimination of several unnecessary permit types, the reduction of timeframes necessary for permit application and issuance, and greater overall efficiency for both the Department and permit applicants. The Department determined that the broader class A special permit, which is the permit least restrictive and most desired by industry representatives, sufficiently facilitates the movement of all specific non-reducible vehicles, combinations of vehicles, or vehicle and load combinations with dimensions that do not exceed the limitations provided under R17-6-201, or the maximum permitted weight computations provided under R17-6-411.

Additionally, the rules provided under R17-6-305 support federal regulation uniformity and certification reciprocity for Arizona's escort vehicle operators and, consistent with A.R.S. 28-1110, support a decrease in regulatory burden on escort vehicle operators who relocate to Arizona after achieving escort vehicle operation certification in another state.

These rules also promote [uniform laws and regulations](#) adopted by the Policy Committee of the Western Association of State Highway and Transportation Officials (WASHTO) in June 2004, updated March 2009, for governing truck size and weight configurations throughout the Western Region of the United States.

**12. Are the rules more stringent than corresponding federal laws? Yes \_\_\_ No X**

*Please provide a citation for the federal law(s). And if the rule(s) is more stringent, is there statutory authority to exceed the requirements of federal law(s)?*

These rules provide commercial motor vehicle owners, operators, and drivers with reasonable access to all state and federal highways and routes under the jurisdiction of the Department for interstate and intrastate operations subject



to numerous federal laws and regulations designed to facilitate commerce and protect the public investment in transportation infrastructure. The following federal regulations are applicable to the subject matter of the rules, but the rules are not more stringent than any applicable federal law: 23 CFR 658, Appendix C of 23 CFR 658, 49 CFR 393.5, 49 CFR 393.11, and Table 1 of 49 CFR 393.11. All transporters subject to these rules are additionally subject to all other federal and state motor carrier safety and hazardous materials regulations currently applicable to all Arizona motor carriers.

Additionally, the rules are subject to review by the U.S. Secretary of Transportation, as provided under 49 U.S.C. 31141, Review and Preemption of State Laws and Regulations. If the U.S. Secretary of Transportation decides that a state law or regulation is less stringent than a regulation prescribed by the Secretary under 49 U.S.C. 31136, the state law or regulation may not be enforced. However, the “grandfather” provisions in the Federal-Aid Highway Act amendments of 1974, allow the Department to continue issuing special permits using the less stringent maximum permitted weight computations provided under R17-6-411, and Tables 3.01 through 3.09, for movement of a non-reducible vehicle or load under these rules since the Tables were enacted prior to the date of enactment of the Federal-Aid Highway Amendments of 1974 and yield higher weights for groups of axles spaced within 3 feet 5 inches and 18 feet. The Department’s axle spacing Tables are an expansion of the Federal Bridge Formula B weights authorized by the Federal Highway Administration and A.R.S. § 28-1100 for use on the National Highway System and are used by the trucking industry for determining the axle spacing needed to appropriately distribute excess weight across multiple groups of axles.

**13. For rules adopted after July 29, 2010 that require the issuance of a regulatory permit, license, or agency authorization, whether the rules are in compliance with the general permit requirements of A.R.S. § 41-1037 or explain why the agency believes an exception applies:**

Each special permit or envelope permit provided by the Department under these rules is specifically authorized by statute and falls within the criteria provided under A.R.S. § 41-1037.

The oversize, overweight, or oversize and overweight special permits issued under these rules are “general permits” in that each permittee issued a particular class of permit is subject to the same activities, practices, requirements, and restrictions applicable to that permit type.

The envelope permits issued under these rules are “general permits” in that each permittee issued an envelope permit is subject to the same activities, practices, requirements, and restrictions applicable to all other envelope permit holders. The Department’s envelope permits can only be issued for non-reducible loads meeting the strict envelope dimensional criteria provided under A.R.S. § 28-1141, which allows motor carrier transporters unlimited trips and load changes within the permit’s validity period, restricts operation to certain routes, and excludes the transporting of a mobile home.

**14. Proposed course of action**

*If possible, please identify a month and year by which the agency plans to complete the course of action.*

No action is necessary. All rules located in this Article were last amended by Final Rulemaking at [28 A.A.R. 1263](#), [effective July 8, 2022](#), and generally meet objectives, are effective, consistent with statute, enforceable, clear, concise, and understandable. The Department proposes no immediate action for any of the rules under this Article.

**Arizona Department of Transportation**

**Five-year Review Report**

**17 A.A.C. Chapter 6**

**Section E**

**Economic Impact Statement**

**ECONOMIC, SMALL BUSINESS AND CONSUMER IMPACT STATEMENT**

**TITLE 17. TRANSPORTATION**

**CHAPTER 6. DEPARTMENT OF TRANSPORTATION**

**OVERDIMENSIONAL PERMITS**

**R17-6-101 through R17-6-511**

**(All Sections, Tables, and Illustrations)**

**A. Economic, small business and consumer impact summary**

**1. Identification of the proposed rulemaking:**

The Arizona Department of Transportation (ADOT) and Overdimensional Permit Council have developed these proposed rules in coordination with a broad coalition of public and private transportation stakeholder groups including the Department of Public Safety (DPS), local law enforcement personnel, Arizona's business community, the Arizona Trucking Association, the Specialized Carriers & Rigging Association and other members of Arizona's trucking, heavy-haul transport, crane, utility, and escort vehicle industries. The proposed rules amend existing oversize and overweight envelope and special permit rules and contain reasonable permit requirements, restrictions, and allowances for transporting oversize and overweight vehicles and loads on the State Highway System.

On publication of final rulemaking at 19 A.A.R. 2486, August 16, 2013, effective September 7, 2013, several members of the Specialized Carriers & Rigging Association contacted the Department to express concern about a change made to the continuous travel allowance previously provided under R17-6-408(B) (now R17-6-205(B)) for the movement of self-propelled mobile cranes, drilling rigs, and similar specialty equipment from a 10' front or rear overhang allowance to a 3' front and 10' rear overhang allowance. In changing the language of the rule, the Department intended to expand the continuous travel allowance for all vehicles by allowing an overhang of up to 13' (previously only 10') as long as 10' of the overhang projected to the rear of the vehicle. However, by changing that language the Department inadvertently eliminated a variable overhang length consideration routinely used by the industry to justify eligibility for continuous travel previously relied on for movement of specialty equipment specifically manufactured for travel with more than 3' of front overhang (i.e., bucket trucks, ladder trucks, utility trucks, etc.). This rulemaking provides a new continuous travel allowance made specifically applicable to the movement of self-propelled mobile cranes, drilling rigs, and similar specialty equipment with no more than 20' of overhang (10' to the front and 10' to the rear) while transporting under a class A - Crane oversize or overweight envelope or special permit.

Representatives of the heavy-haul and oversize and overweight transport industries requested that the Department further clarify the rules by making minor technical corrections that may provide additional regulatory relief for the industry and ensure that the rules are more clear, concise, and understandable. Rule

amendments, technical corrections, and clarifying changes considered by the Department since publication of the final rules on oversize and overweight special permits on August 16, 2013, include:

- a. Adding a special continuous travel allowance to accommodate self-propelled mobile cranes, drilling rigs, and similar specialty equipment traveling under a class A - Crane special permit at no more than 11' in width, 14' 6" in height, 10' in length of front overhang, and 10' in length of rear overhang;
- b. Removing an outdated address from the definition of "Arizona Central Commercial Permits Office";
- c. Providing clearer references to the thresholds at which a vehicle or a self-propelled mobile crane, drilling rig, or similar specialty equipment becomes subject to the metropolitan curfew transport allowance and restrictions provided under R17-6-404;
- d. Adding a class A annual permit option and a 30-day permit option as provided under Laws 2014, Ch. 60 (HB2430), to accommodate industry requests for expansion of the more desirable class A special permit by consolidating and renaming the class B - Oversize Combination, class B - Type R - Oversize Recreational Vehicle, class D - Crane, class G - Overwidth Vehicle or Combination, and class H - Overwidth Watercraft special permits, since the class A special permits can now accommodate all dimensions and permit options previously only available under the separate permit classes;
- e. Updating R17-6-102, Table 1, Threshold Dimensions, to reflect the higher legal thresholds provided under Laws 2016, Ch. 52 (HB2251), and the federal "Fixing America's Surface Transportation Act" or "FAST Act";
- f. Clarifying R17-6-103 and R17-6-204 (as renumbered to R17-6-211), for delinquent tax reporting purposes under A.R.S. § 42-19157, by prescribing the method and procedure used by the Department to verify eligibility for movement of a mobile home subject to payment of ad valorem taxes, including clarification on what the Department may accept as evidence of ad valorem tax payment or clearance;
- g. Repealing R17-6-212, Table 6, as duplicative information since all bridges currently designated by the Department as weight restricted are identified as such under R17-6-412, Table 4; and a special permitted vehicle with at least one tridem axle group configured as provided under R17-6-212 to distribute heavier weights over a larger surface area, may now travel on any route of the State Highway System, unless otherwise restricted under R17-6-412, Table 4;
- h. Repealing R17-6-212, Table 7, since the axle group weight calculations are no longer applicable to the new axle spacing criteria provided for class C - Tridem axle group configurations under R17-6-212;
- i. Consolidating the gross weight categories permitted for reducible vehicle and load combinations traveling under a class E special permit in conformance with legislative changes provided by Laws 2014, Ch. 60 (HB2430);
- j. Repealing the Western Regional Trip Permit previously made available under R17-6-211, since issuance of the permit was discontinued as provided under the Western Association of State Highway and Transportation Officials (WASHTO) Resolution 03-18, effective December 31, 2018;
- k. Providing illustrations of the warning flag configurations and safety lighting device requirements for vehicles or loads extending more than four feet beyond the front of a vehicle;

- l. Adding a reference to the general highway operations requirements under R17-6-401 to remind permittees and drivers issued any multiple trip oversize or overweight envelope or special permit to access and review the most current information on highway-specific restrictions, requirements, conditions, and allowances indicated on the Department’s website prior to commencing transport, as currently required under R17-6-412;
- m. Clarifying that the general term “houseboat,” when transported under an envelope or special permit issued by the Department as provided in A.R.S. § 28-1144(B), and this Chapter, encompasses all large non-reducible watercraft, including a yacht;
- n. Correcting the weight tables used for maximizing the amount of weight allowed when using wider tires on axle group configurations with two or more axles;
- o. Updating R17-6-412, Table 4, to reflect the most recent bridge height and weight restriction information as posted in real time on the Department’s website; to remove some under-legal width restrictions no longer necessary on certain routes; and to expand the number of routes that can now accommodate oversize and overweight vehicles, combinations of vehicles, or vehicle and load combinations using tridem axle group configurations;
- p. Removing all curfew routes and restrictions from the Yuma metropolitan area; and
- q. Updating the statutory reference in the definition of “mobile home” to reflect changes made by Laws 2016, Ch. 128, §§ 19 through 21 (SB1530), which renumbered A.R.S. § 41-2142 as A.R.S. § 41-4001.

Additionally, this rulemaking will allow the Department to lift size or weight restrictions on certain routes for vehicle and load combinations operating in support of projects aimed at protecting watersheds from the negative environmental and economic impacts of flood damage, maintaining the health and vitality of at-risk timber forests, supporting the economic development of communities, and preventing loss of life and significant property or infrastructure damage as a result of catastrophic forest fires. State and federal hazardous fuel reduction projects are currently being conducted under Arizona’s Four Forest Restoration Initiative, which is a collaborative effort to restore forest ecosystems on portions of four National Forests - Coconino, Kaibab, Apache-Sitgreaves, and Tonto - along the Mogollon Rim in northern Arizona and to reduce any constant threats to forest and rangeland health throughout rural Arizona.

This rulemaking also addresses all issues identified in the Department’s five-year review report approved by the Governor’s Regulatory Review Council July 12, 2018.

**2. Brief summary of the information included in the economic, small business, and consumer impact statement:**

This rulemaking details eligibility, application, and use requirements for a variety of permits the Department currently issues to commercial motor carriers for the operation of commercial motor vehicles, combinations of vehicles, or vehicle and load combinations exceeding any statutorily prescribed maximum size or weight limitation. The applicable statutes also provide authority for the Department to issue permits, require route analysis and approval, set conditions and restrictions, and collect fees.

This rulemaking aligns the Department's definition of a "non-reducible vehicle or load" with the federal definition of "non-divisible load or vehicle" and modifies the Department's issuance criteria for class A special permits to accommodate all vehicles, or vehicle and load combinations, previously only eligible for a class B, class B-Type R, class D, or class G special permit. The Department has determined that the broader class A special permits, which are the least restrictive permits most desired by industry representatives, will sufficiently encompass all specific non-reducible vehicles, combinations of vehicles, or vehicle and load combinations with dimensions that do not exceed the limitations provided under R17-6-201, or the maximum permitted weight computations provided under R17-6-411.

Since these rules modify the parameters of the Department's existing class A special permit to more closely follow the general permit requirement provided under A.R.S. § 41-1037 and to reduce the number of permit classes, categories, and types of special permits that each applicant must currently consider each time the applicant applies for permission to transport a vehicle or vehicle and load combination using the State Highway System, the Department anticipates only a minimal to moderate economic impact to the entities identified under item (B)(3) due to the costs involved in retraining personnel to apply for the appropriate permit using the Department's electronic permitting system.

The Department intends to begin collecting permit and trip data from all permittees or drivers using the new class C annual envelope permit with tridem axle group configurations as introduced under R17-6-505. The Department's traffic, bridge, pavement, and maintenance engineers will use the collected data to analyze and quantify infrastructure consumption costs associated with the extended use of tridem axle group configurations. Permittees and drivers subject to this new data collection requirement will be able to easily complete the required electronic notification process through the Department's website and will experience only the slightest degree of economic impact in reporting this critical information to the Department before each trip. However, permittees or drivers using the new class C annual envelope permit with tridem axle group configurations will experience a minimal to moderate benefit when using this new process since they will no longer be required to apply separately for a single-trip permit each time they need to move a vehicle or load.

Arizona's motoring public will experience no direct costs as a result of this rulemaking, but may experience the unquantifiable benefits the rules provide in maintaining general highway safety measures and supporting cost abatement in the preservation and integrity of the State Highway System infrastructure.

**a. The conduct and its frequency of occurrence that the rule is designed to change:**

The rule amendments detail the eligibility, application, and use requirements for a variety of permits the Department currently issues to commercial motor carriers for transporting vehicles or vehicle and load combinations exceeding the maximum size or weight limitations provided by statute. The Department needs to update these rules on a regular basis to maintain general highway safety measures and support cost abatement in the preservation and integrity of the State Highway System infrastructure.

**b. The harm resulting from the conduct the rule is designed to change and the likelihood it will continue to occur if the rule is not changed:**

If the rules are not updated the Department will be unable to accommodate industry requests for transport of oversize and overweight vehicles, or vehicle and load combinations, throughout the state in a safe and efficient manner.

**c. The estimated change in frequency of the targeted conduct expected from the rule change:**

With the updated rules in place, the Department, law enforcement agencies, and the oversize and overweight transport industry can more uniformly coordinate movement of oversize and overweight vehicles and loads throughout the state to protect the safety and welfare of the traveling public. Industry can be assured that all Arizona regulations regarding oversize and overweight vehicles and loads are in alignment with most of the other western states and uniformly enforced.

**3. Name and address of agency employees who may be contacted to submit or request additional data on the information included in the economic, small business and consumer impact statement:**

Name: John Lindley, Senior Rules Analyst  
 Address: Arizona Department of Transportation  
 Administrative Rules and Policy Development Office  
 206 S. 17th Ave., Mail Drop 180A  
 Phoenix, AZ 85007  
 Telephone: (480) 267-6543  
 E-mail: jlindley@azdot.gov

**B. Economic, small business and consumer impact statement**

**1. Identification of the proposed rulemaking:**

See paragraph (A)(1) above.

**2. Identification of persons who will be directly affected by, bear the costs of or directly benefit from the proposed rulemaking:**

Under this rulemaking, the agency identifies the following entities that may bear costs and receive benefits that may range from minimal to substantial:

<b>Persons to bear costs</b>	<b>Persons to directly benefit</b>
ADOT	ADOT
Arizona DPS	Arizona DPS
Political subdivisions that issue permits to oversize and overweight vehicles operating on local roadways other than the state highway system	Political subdivisions that issue permits to oversize and overweight vehicles operating on local roadways other than the state highway system
Arizona utility providers	Arizona utility providers



<b>Persons to bear costs</b>	<b>Persons to directly benefit</b>
Commercial transporters requiring oversize and overweight permits	Commercial transporters requiring oversize and overweight permits
Escort vehicle services	Escort vehicle services
Businesses or consumers requiring movement of oversize and overweight loads	Businesses or consumers requiring movement of oversize and overweight loads
Private certified engineering companies	Private certified engineering companies
	Arizona's motoring public

**3. Analysis of costs and benefits occurring in this state:**

Cost-revenue scale. Annual costs or revenues are defined as follows:

- Minimal           \$9,999 or less
- Moderate        \$10,000 to \$499,999
- Substantial      \$500,000 or greater

<b>Group Affected</b>	<b>Increased Cost</b>	<b>Decreased Cost</b>
<b>Description of Effect</b>	<b>Decreased Revenue</b>	<b>Increased Revenue</b>
ADOT	Moderate for aggregate administrative and operating costs	Substantial for permit revenues and engineering analysis charges
Arizona DPS	Non-quantifiable percentage of total enforcement duties statewide	Non-quantifiable percentage of total sanctions imposed but not specifically tracked for oversize and overweight transport-related citations
Political subdivisions that issue permits to oversize or overweight vehicles operating on local roadways other than the state highway system	Probably minimal, if any	Probably minimal, if any

<b>Group Affected</b>	<b>Increased Cost</b>	<b>Decreased Cost</b>
<b>Description of Effect</b>	<b>Decreased Revenue</b>	<b>Increased Revenue</b>
Transporters requiring oversize and overweight permitting	Minimal to moderate depending on load dimensions, permit class, and peripheral transport costs	Minimal to moderate depending on load dimensions, permit class, and peripheral transport costs balanced against profit margin assessed to customer
Escort vehicle services	Assumed minimal to moderate depending on job order, trip distance, duration, equipment cost overhead	Minimal to moderate depending on charges to clients assumed to reflect job-scope-driven profit margin
Businesses or consumers requiring movement of oversize and overweight loads	Minimal to moderate depending on transporter-assessed charges	Assumed moderate to substantial, but not readily quantifiable depending on the business nature and intended transport purpose
Private certified engineering companies	Probably minimal administrative costs	Minimal to substantial depending on independent analysis charges assessed to client and number of new clients
Arizona's motoring public	No direct cost	Not readily quantifiable in public safety and assured repair and maintenance cost avoidance to highway structures

**a. Probable costs and benefits to ADOT and other agencies directly affected by the implementation and enforcement of the proposed rulemaking:**

As a multi-modal transportation agency, the Arizona Department of Transportation is primarily responsible for planning, building, operating and maintaining a complex highway system. The Department also provides for the safe and efficient movement of people, goods, and services throughout the state, while promoting compliance with all applicable state and federal laws and regulations developed to protect and preserve all state and federal highway infrastructure under the jurisdiction of the Department. The Arizona Department of Public Safety assists the Department in performance of those duties, and both agencies endeavor to make Arizona highways safer for all motorists by:

Enforcing all motor carrier safety regulations;

Requiring all trucks of every weight and classification to be configured, maintained, and driven in ways that maximize public safety; and

Ensuring that all commercial motor vehicle owners, operators, and drivers comply with all applicable state and federal commercial motor vehicle safety regulations, weight laws, and driver qualification standards.

As indicated in Arizona’s statewide Long-Range Transportation Plan, [What Moves You Arizona \(WMYA\) 2040](#):

ADOT is responsible for maintaining, operating, and improving 18,488 miles of the State Highway System. Although the State Highway System constitutes less than 10 percent of the total public roadway miles in Arizona, it carries 50 percent of the total traffic and nearly 90 percent of all the heavy truck traffic;

ADOT is also responsible for monitoring the conditions on all 7,826 bridges on state and local roads in Arizona, and for replacing, maintaining and preserving the 4,811 state-owned bridges that are part of the State Highway System; and

Arizona and the state of Sonora, Mexico share approximately 360 miles of international border. During 2014, more than \$437 billion worth of goods moved through the U.S.-Mexico border using trucks, rail and pipeline.

The Department of Public Safety, local law enforcement personnel, and certain members of Arizona’s trucking, heavy-haul transport, crane, utility, and escort vehicle industries, including the Arizona Trucking Association, the Specialized Carriers & Rigging Association, and Arizona’s business community may experience minimal costs for re-training any personnel involved with the application, issuance, and use of oversize and overweight envelope or special permits issued by the Department under these rules.

This rulemaking does not increase any fee currently required on application for an oversize or overweight envelope or special permit. In Calendar Year 2019, the Department generated \$4,854,485 by issuance of 82,093 oversize and overweight envelope and special permits for distribution to the Highway User Revenue Fund as prescribed under A.R.S. § 28-6533, and the State Highway Fund as prescribed under A.R.S. § 28-1105(A)(2). The Table below outlines the issuance counts and revenue collections for each type of oversize and overweight permit classification issued by the Department under these rules in Calendar Year 2019:

<b>Permit Classification</b>	<b>Permits Issued</b>	<b>Highway User Revenue Fund</b>
Envelope Permit (30-Day)	4	\$3,700
Envelope Permit (Annual)	1376	\$1,213,425

<b>Permit Classification</b>	<b>Permits Issued</b>	<b>Highway User Revenue Fund</b>
Envelope Permit Houseboat (Annual)	13	\$16,550
Class A (Single-Trip)	42859	\$1,329,795
Class A (30-Day)	13301	\$629,370
Class A Mobile Home (Single-Trip)	11155	\$164,925
Class A Western Regional (Single-Trip)	1	\$15
Class B (30-Day)	1138	\$34,110
Class B (Annual)	209	\$68,040
Class C (Single-Trip)	4451	\$331,325
Class C Mobile Home (Single-Trip)	2723	\$80,745
Class C Tridem Axle (Single-Trip)	1706	\$150,600
Class D (Single-Trip)	0	\$0
Class D (30-Day)	466	\$34,425
Class D (Annual)	227	\$125,400
Class E (Single-Trip)	12	\$825
Class E (30-Day)	831	\$61,350
Class E (Annual)	1535	\$606,480
Class G (Single-Trip)	12	\$180
Class G (30-Day)	1	\$30
Class G (Annual)	0	\$0
Class H (Annual)	73	\$3,195
<b>Totals</b>	<b>82,093</b>	<b>\$4,854,485</b>

The Department intends to begin collecting permit and trip data from all permittees or drivers using the new class C annual envelope permit with tridem axle group configurations as introduced under R17-6-505. The Department's traffic, bridge, pavement, and maintenance engineers will use the collected data to analyze and quantify infrastructure consumption costs associated with the extended use of tridem axle group configurations. Permittees and drivers subject to this new data collection requirement will

be able to easily complete the required electronic notification process through the Department's website.

### **Arizona Central Commercial Permits and Arizona Ports of Entry**

The Department issues oversize and overweight special permits statewide through its Arizona Central Commercial Permits office and Arizona ports of entry. Certain classes of permits not requiring special clearance conditions may be issued online through the Department's website or at any statewide port of entry. Port of entry budgetary expenditures pertaining to oversize and overweight permitting, however, cannot be specifically quantified because officers and equipment serve other functions besides issuing oversize and overweight permits. Ports of entry monitor all commercial traffic entering Arizona for registration, taxes, size and weight restrictions, commercial driver license requirements, insurance requirements and equipment safety requirements, and issue permits as required.

### **Class C Permits**

Although the Arizona Central Commercial Permits office and Arizona Ports of Entry issue oversize and overweight permits within specific size and weight thresholds, the Department's Class C Maintenance Permit Services is responsible for coordinating issuance of class C special permits for heavy-haul transport of specialized equipment (superloads) over class A permit limits. Class C Maintenance Permit Services technicians facilitate requests for engineering analysis of any route proposed by a permit applicant for superload transport, issue all appropriate clearances and highway restrictions, and communicate details of the transport operation to the permit holder and all appropriate field personnel.

Other Department employees spend periodic time on class C permits, though at a not-readily-quantifiable cost. These employees include the Assistant State Engineer, Deputy State Engineer, and regional traffic engineers for conflict resolution.

In Calendar Year 2019, there were 8,880 class C permits issued. Class C Maintenance Permit Services has two FTEs that participate in class C oversight, along with other job duties. Class C permit oversight includes performing structural analysis, axle-weight analysis, and route determination based on height, width, and length.

### **Bridge Group**

To maintain the integrity of Arizona highways and highway structures for the motoring public, the Department's Bridge Group is responsible for performing or reviewing an engineering analysis of any route proposed by a permit applicant for superload transport. Overweight vehicles can shorten the lifespan of some types of bridges. Repairs to highway structures can be a substantial cost to the Department, and indirectly to the general public. One example of a costly repair was in Phoenix at the

Jefferson bridge on I-17, where an overweight vehicle caused damages costing \$80,000 to repair. A major portion of any repair work is for necessary traffic control.

For class C vehicles over the axle weight limits provided under R17-6-411, Tables 3.01 through 3.09, an engineering analysis must be performed. An engineer analyzes a bridge's characteristics to ensure that the overweight vehicle will not overstress or damage the bridge structure. Bridge engineers must examine the weight of each transporting vehicle per axle where the stress is applied to the highway structure, not necessarily the total weight of a vehicle and load. A registered engineer must perform the engineering analysis as part of the class C permit clearance for vehicles, or vehicles and loads, over 250,000 pounds, or traveling at a size or weight over bridge formula limits, or found by law enforcement with axle weights over the allowable bridge weights. The Bridge Group performs more than 100 engineering analyses per year for the oversize and overweight transport industry seeking class C special permits. The Bridge Group currently has 2 FTEs that participate in this function, along with other job duties. The Bridge Group estimates its engineers spend an average of 2,080 hours each year to perform engineering analyses for these oversize and overweight special permit applications.

To recover some of the employee costs for performing or reviewing an engineering analysis, the Department charges a class C review and analysis fee of \$125 per 50-mile increment if performing the engineering analysis on a proposed route, or \$75 per 50-mile increment to review an engineering analysis of a proposed route prepared by a private registered engineer. If the Department is unable to dedicate the employee resources necessary to timely complete the required analysis, a permit applicant may obtain an analysis prepared by a private registered engineer at the applicant's own expense. Permit applicants pay the reduced amount when submitting an engineering analysis performed by a private registered engineer, since the Department's bridge engineers must verify any findings and conclusions presented by the analysis. A flat charge provides certainty for the industry who will know the amount of additional charges based on the mileage of the proposed route. Review and analysis fees are charged up front at the time of application but the permit fees are charged upon issuance of the permit. Collection up front ensures that ADOT is paid for performing the work even if the engineering analysis shows that a highway structure will not support an overweight vehicle as the requested, or the customer does not purchase the permit. The flat charge is easier for ADOT to process and staff will not have to track individually the amount of time spent on each engineering analysis or calculate the number of bridges to be crossed. ADOT may lose money on some of the engineering analyses performed since the flat charge is an average. Any monies received for performing an engineering analysis are deposited into the Highway User Revenue Fund.

#### **Arizona DPS**

Currently, DPS is the exclusive provider of law enforcement escorts for oversize and overweight special permitted vehicles traveling in Arizona. As demand for law enforcement escorts continues to

rise, some oversize and overweight vehicle transporters have experienced unexpected and sometimes costly delays while having to adjust the timing of a scheduled transport to coincide with the availability of an appropriate number of law enforcement escorts. Although DPS has measures in place to accommodate a high number of oversize and overweight vehicles requiring law enforcement escorts, and ADOT has taken steps to reduce the number of routes that require law enforcement escorts, the oversize and overweight vehicle transport industry has experienced additional relief since DPS can now defer law enforcement escort duties to any uniformed certified law enforcement officer in a fully marked patrol vehicle as long as at least one officer is certified for enforcement of the Federal Motor Carrier Safety Regulations of the U.S. Department of Transportation's Federal Motor Carrier Safety Administration. DPS must be contacted at least 12 hours before a scheduled transport. If DPS is unable to provide the escorts requested, the permittee or driver may use uniformed certified law enforcement escorts who are qualified under R17-6-306.

DPS is responsible for statewide enforcement of state and federal transportation law. In so doing, a portion of their annual budgetary expenditure logically entails commercial motor vehicle enforcement. Under commercial motor vehicle enforcement, DPS performs the following functions that include oversize and overweight vehicle enforcement regulation:

- i. Patrolling,
- ii. Citing for violations,
- iii. Issuing out-of-service orders,
- iv. Investigating accidents,
- v. Internal officer training statewide,
- vi. Providing traffic control when required under terms of certain class C permits,
- vii. Performing necessary carrier audits, and
- viii. Tracking statewide motor carrier statistical data.

While ADOT is well aware that DPS performs all the functions listed, ADOT cannot quantify any of the items specifically for oversize and overweight vehicles because DPS does not track oversize and overweight vehicles separately in any of the categories. Oversize and overweight vehicles are simply combined with all other motor carriers. For that reason, DPS cannot supply ADOT with specific data concerning the economic impact of oversize and overweight vehicle enforcement to that agency.

**b. Probable costs and benefits to a political subdivision of this state directly affected by the implementation and enforcement of the proposed rulemaking:**

ADOT regulates the state highway system. Political subdivisions are able to further regulate oversize and overweight permitting on local roadways at their own discretion. To do so, from ADOT's perspective, would create non-quantifiable (probably minimal) administrative costs to the regulating political subdivision.

**c. Probable costs and benefits to businesses directly affected by the proposed rulemaking, including any anticipated effect on the revenues or payroll expenditures of employers who are subject to the proposed rulemaking:**

This rulemaking brings the Department's rules into conformance with all applicable provisions prescribed under the federal [“Fixing America’s Surface Transportation Act”](#) or “FAST Act” signed into law on December 4, 2015, which provided some level of regulatory relief for motor carriers trying to maintain compliance with federal regulations while operating certain types of commercial motor vehicles in interstate commerce. The Department is updating R17-6-102, Table 1, to reflect the new legal thresholds provided under the FAST Act and Laws 2016, Chapter 52, which:

- Increased the allowable length of a stinger-steered automobile or boat transporter from 75 feet to 80 feet and provided that up to four feet of front overhang and six feet of rear overhang on the automobile or boat transporter shall not be included when measuring the overall length of the vehicle and load for legal operation in interstate commerce as provided under 49 United States Code (U.S.C.) § 31111(a) and (b);
- Increased the allowable length of a towaway trailer transporter combination to 82 feet when operated on the Interstate Highway System;
- Clarified that a vehicle carrying fluid milk products is now deemed under 23 U.S.C. § 127(a) to be a load that cannot be easily dismantled or divided, and as such, is a “non-reducible load or vehicle” eligible for special permit issuance under A.R.S. § 28-1103 and these rules;
- Provided an exception from the existing 20,000 pound single axle load limit allowing an over-the-road bus to operate with a single axle load limit of up to 24,000 pounds without a special permit;
- Clarified the term “emergency response vehicle” as it relates to the “non-reducible load or vehicle” designation provided for oversize and overweight special permit issuance when traveling on the Interstate Highway System, to include vehicles loaded with salt, sand, chemicals or a combination thereof, with or without a plow or blade attached in front, when being used for the purpose of spreading the material on highways that are or may become slick or icy;
- Increased the maximum gross vehicle weight allowance for natural gas and electric battery vehicles traveling on the Interstate Highway System by an amount equal to the difference between the weight attributable to the vehicle’s natural gas tank and fueling system or electric battery system and the weight of a comparable diesel tank and fueling system (up to 82,000 pounds) as provided under 23 U.S.C. § 127(s); and
- Clarified the special permit issuance process for commercial motor carriers using otherwise reducible overweight vehicles or vehicle and load combinations on the Interstate Highway System for delivering supplies and other relief during periods of national emergency.

The Department has determined that the benefits of these rules far outweigh the costs of the rules and anticipates that all affected businesses will experience an unquantifiable, but welcome, financial benefit as a result of the Department’s ability to issue special permits authorizing increased weight



allowances on more routes for vehicles, or vehicle and load combinations, equipped with at least one tridem axle group configuration.

Additionally, this rulemaking supports appropriately scaled, sustainable, forest product industries currently working throughout the state to safeguard the health, safety, and welfare of visitors to the National Forests and any residents of the surrounding communities by reducing unnecessary fuel loads for the elimination of, or a significant reduction in, any future possibility of fueling devastating forest fires. These industries strengthen local economies while conserving natural resources and aesthetic values across the state.

This rulemaking allows the Department to provide the sustainable forest product industry with a more cost-effective way to move or remove natural forest products or biomass in direct support of the Department's ongoing cooperative efforts with the U.S. Forest Service, the Arizona Department of Forestry and Fire Management, county officials, and Arizona cities and towns. These ongoing efforts help to mitigate the effects of wildfires, correct damages, and provide other improvements necessary for the successful management of forest health by making it easier for these businesses to engage in activities designed to:

- Increase forest resiliency and sustainability;
- Reduce risk of undesirable fire effects;
- Improve terrestrial and aquatic species habitats;
- Improve conditions and functionality of streams and springs;
- Restore woody riparian vegetation; and
- Preserve cultural resources.

All of these businesses play a key role in achieving the goals of Arizona's Four Forest Restoration Initiative by harvesting, processing, and selling wood products, thereby reducing treatment costs and providing additional economic opportunities.

Oversize and overweight transporting entities or persons:

*Under all permit classes other than class C:*

Costs imposed by the Department to the transporter are minimal per permit according to the fee schedules provided under A.R.S. § 28-1105 and 17 A.A.C. 6, Article 2. Oversize and overweight transporters do have a margin of time and scheduling inconvenience with the following:

- i. Urban transport curfew times in the Phoenix and Tucson metropolitan areas,
- ii. Weekend and holiday transport blackout times, or
- iii. Permanent highway restrictions as prescribed under R17-6-412, Table 4.

ADOT upholds the above restrictions not to impede commerce but to preserve general public safety and protect highway fixture structural integrity. However, qualified vehicles and loads remain eligible for night, weekend, and holiday movement on specified highways during specified hours. ADOT

traffic engineers have determined that the specified highways should be able to tolerate oversize and overweight vehicles at the specified hours without unduly impeding the motoring public based on traffic patterns and highway design. All proposed restrictions considered, the agency is convinced that the potential financial benefits to industry remain substantial for being able to deliver goods and services in a timely manner legally and safely under permit.

*Under Class C:*

Class C permitted vehicles are the largest, heaviest, and longest vehicles. Due to the time required for Department staff to ensure proper clearance for a vehicle and load, it may take a few days before a permit is issued. This can be a cost to industry if proper planning is not taken into account for time delays.

Only a class C permitted vehicle would be over axle weight and therefore require an engineering analysis. There is a possibility that ADOT would decline to perform an engineering analysis due to lack of employee resources, but this should happen only for an extremely overweight vehicle, such as described in the outlier example below. ADOT will not charge for another engineering analysis for an identical vehicle, load dimensions, and route, assuming no change to the highway or highway structures.

A class C permitted vehicle is more likely to require other costs due to its size, such as notifying and obtaining clearance from utility companies for overhead wires, ensuring clearance of all highway structures, or performing alteration or restoration of any damaged highway features. A class C permitted vehicle also is more likely to require escort vehicle accompaniment, which could include a requirement for law enforcement escort accompaniment by DPS or other law enforcement agencies. It could also incur additional costs for fuel or time delay due to alternative routing if the most direct route is not able to accommodate a vehicle of its size.

*Manufactured or mobile home transporters:*

Class A permits are issued within three hours of application and the Department maintains an electronic online permitting system as a convenience to customers applying for oversize and overweight permits in most permit classes. The online system provides for uniform treatment of industry transporters regardless of cargo type under transport.

The oversize and overweight transport industry has continuously, and successfully, challenged ADOT to re-evaluate all of its permitting rules, policies, and procedures to ensure that permitting decisions are scientifically based and uniformly administered throughout the state, rather than being made arbitrarily or somehow influenced by the personal opinions of permit technicians or field personnel.

**4. General description of the probable impact on private and public employment in businesses, agencies and political subdivisions of this state directly affected by the proposed rulemaking:**

The Department anticipates a minimal impact on public or private employment by this rulemaking. For the most part, the oversize and overweight permit function is in full operation with existing employees in government and private industry.

Private engineering firms could experience an increased work demand for analysis services if the Department is unable to perform an engineering analysis due to lack of resources.

**5. Statement of the probable impact of the proposed rulemaking on small businesses:**

**a. Identification of the small businesses subject to the proposed rulemaking:**

The small businesses subject to these rules, as defined under A.R.S. § 41-1001(20), with fewer than 100 employees or less than \$4 million annual receipts qualify as a small business:

- i. A motor carrier entity transporting oversize and overweight vehicles or loads,
- ii. An escort vehicle entity providing services to a motor carrier as a requirement of oversize or oversize and overweight permit issuance,
- iii. An enterprise that must secure services of an oversize and overweight carrier to deliver goods for which the enterprise must absorb total or partial transport costs, or
- iv. A private certified engineering firm performing highway structural analysis for a motor carrier that intends to procure an oversize and overweight permit under class C.

Escort vehicle services:

The agency estimates that escort vehicle services could benefit moderately to substantially over their presumed minimal costs of outfitting escort vehicles for safety compliance prescribed under R17-6-305.

Private engineering firms:

A private engineering firm providing analysis services to an applicant for an oversize and overweight permit could benefit minimally to substantially. Private engineering firms may have some increase in clients if the Department is unable to dedicate the employee resources necessary to timely complete a required engineering analysis. The agency cannot quantify potential costs to engineering firms, since any costs are part of an engineering firm's general overhead and not directly related to the requirements of this rulemaking. ADOT estimates that a private engineering firm charges approximately \$130 per hour for performing an engineering analysis.

Businesses requiring transport of oversize or overweight loads:

The agency cannot quantify transport industry costs passed on to customers. Neither the industry nor its customers are required to disclose transport costs to the Department. Transport costs would probably be minimal for repeat customers. For one-time or highly specialized projects, customer costs reach substantial amounts. Similarly, there may be delay-related costs passed-on to a customer but these instances are also unpredictable and unquantifiable. The Department anticipates that the benefit

to customers of oversize and overweight transporters is assumed to be moderate to substantial since transport of oversize and overweight loads is usually a high-profit business venture.

**b. Administrative and other costs required for compliance with the rulemaking:**

Uniform safety and compliance costs for small businesses are the same as discussed under paragraph (B)(3)(c) above. The Department anticipates no other new economic impact to persons and business entities as a result of this rulemaking.

Permit costs are minimal and permit fees are set by statute. Administrative costs for employee time and effort in making application and record keeping for oversize and overweight permits is probably a negligible percentage of a transport entity's office staff salary. Escalating permittee costs only arise in cases of class C permits requiring peripheral expenses to ensure safety to state highway structures, traffic control, or engineering analysis. These latter costs, however, are not expected to increase above current levels as a result of this rulemaking.

**c. Description of the methods that ADOT may use to reduce the impact on small businesses:**

The cost of permits and the permitting function is uniform regardless of business size. Moreover, permit costs themselves are minimal. The agency sees no opportunity to further reduce costs for small businesses. If a small transport-related business is contemplating a larger (class C) transport project, the business should be well aware of the peripheral costs associated with the project before embarking on such an endeavor.

In support of these necessary special permit issuance requirements, the Department currently maintains a modernized, mobile-friendly, Arizona 511 Traveler Information System website that uses the latest technology to provide a customized experience with real-time updates. The AZ511.gov website allows users to save their favorite routes and their most used traffic cameras. Before leaving for a destination, each permittee or driver is required under these rules to log on to AZ511.gov and review all incident alerts relative to their intended route, get estimated travel times to their destination, and receive information regarding any detours or alternate routes that may be necessary. A permittee or driver may set up automatic text or email alerts to receive real-time updates on any incidents that may affect transport along their intended route. A permittee or driver may also call the Department's 511 phone line to hear personalized updates. The 511 phone line is now easier to navigate and the voice recognition software has been upgraded.

**d. Probable cost and benefit to private persons and consumers who are directly affected by the proposed rulemaking:**

Persons not associated with the oversize and overweight transport industry incur no costs from the provisions of this Chapter. Generally, the benefit to the at-large motoring public of Arizona is assured integrity of highway structure, minimized highway tax expenditure on repair and maintenance of structures spared from oversize and overweight vehicle collision or stress damage, and assurance that oversize and overweight loads are transporting authorized load dimensions, on authorized highways, at

authorized times so as to minimize traffic delays. While the benefit to Arizona's motoring public is not readily quantifiable, it is in the best interest of Arizona citizens to have these regulations in effect to maximize overall safety for all highway users.

**6. Statement of the probable effect on state revenues:**

ADOT benefits by annual permit revenues as listed under (B)(3)(a). Arizona DPS experiences not-readily-quantifiable benefits from oversize and overweight transporter citation sanctions and charges assessed to carriers when DPS traffic control is required as special terms of a class C permit. This rulemaking does not increase fees for oversize or overweight permits.

**7. Description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed rulemaking, including the monetizing of the costs and benefits for each option and providing the rationale for not using non-selected alternatives:**

In rulemaking, the Department routinely adopts the least costly and least burdensome options for any process or procedure required of the regulated public or industry. See 5(c).

**C. Explanation of limitations of the data and the methods that were employed in the attempt to obtain the data and a characterization of the probable impacts in qualitative terms. The absence of adequate data, if explained in accordance with this subsection, shall not be grounds for a legal challenge to the sufficiency of the economic, small business and consumer impact statement:**

The primary limitation to precise assessment of economic data is the vast array of stakeholder business and private-interest users of oversize and overweight permits. Interstate oversize and overweight operators, for example, may have widely different economic interests or challenges transporting through Arizona in contrast with intrastate only operators. Recreational or watercraft vehicles present more economic burdens as far as time, scheduling, and viable competition for merchants or private owners. The wide range of peripheral expenses for analysis, clearance, traffic control, or possible highway structural security maintenance under class C defies adequate appraisal and discussion. Added to all the industry variables, the fact that industry's actual costs are confidential to the operating entity leaves the agency at a loss when attempting to present a thorough and true picture to a party interested in assessing the collected costs of operating under an oversize and overweight permit. Nevertheless, the agency assures interested business and public persons that the cost of individual oversize and overweight permits is minimal and will remain so. The agency must advise any person or business contemplating transport of unusual or extraordinary-sized loads to be thorough in obtaining estimates when contracting for transport costs from established and reliable transport contractors.

**Arizona Department of Transportation**

**Five-year Review Report**

**17 A.A.C. Chapter 6, all Articles**

**Section C**

**Rule Text**



Administrative Rules Division
The Arizona Secretary of State electronically publishes each A.A.C. Chapter with a digital certificate. The certificate-based signature displays the date and time the document was signed and can be validated in Adobe Acrobat Reader.

TITLE 17. TRANSPORTATION

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Authority: A.R.S. §§ 28-366, 28-1103, 28-1104, 28-1105, 28-1111, 28-1149, 28-5204, 28-7045 and 42-19157
23 U.S.C. § 127, and 49 U.S.C. §§ 31111, 31112, 31113, and 31114.

Supp. 22-2

Editor's Note: 17 A.A.C. 6, consisting of Articles 1 through 5, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

CHAPTER TABLE OF CONTENTS

ARTICLE 1. GENERAL PROVISIONS

Article 1, consisting of Sections R17-6-101 through R17-6-112, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

Table listing sections R17-6-101 through R17-6-113 with descriptions and page numbers.

ARTICLE 2. SPECIAL PERMIT CLASSES AND FEES

Article 2, consisting of Sections R17-6-201 through R17-6-210, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

Table listing sections R17-6-201 through R17-6-208 with descriptions and page numbers.

Table listing sections R17-6-209 through R17-6-212 with descriptions and page numbers.

ARTICLE 3. SAFETY REQUIREMENTS

Article 3, consisting of Sections R17-6-301 through R17-6-308, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

Table listing sections R17-6-301 through R17-6-308 with descriptions and page numbers.

ARTICLE 4. TRANSPORT PROVISIONS

Article 4, consisting of Sections R17-6-401 through R17-6-412, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

Table listing sections R17-6-401 through R17-6-408 with descriptions and page numbers.

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

R17-6-409. Lake-specific Weekend and Holiday Transport Exception ..... 23

R17-6-410. Special Mobile Home Towing Restriction ..... 23

R17-6-411. Maximum Permitted Weights ..... 23

Illustration 3. Overweight Axle Group Weight Calculation ..... 24

Table 3.01. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 0 Inches ..... 25

Table 3.02. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 3 Inches ..... 26

Table 3.03. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 6 Inches ..... 27

Table 3.04. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 9 Inches ..... 28

Table 3.05. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 0 Inches ..... 29

Table 3.06. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 3 Inches ..... 30

Table 3.07. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 6 Inches ..... 31

Table 3.08. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 9 Inches ..... 32

Table 3.09. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 10 Feet 0 Inches ..... 33

Illustration 3. Repealed ..... 33

R17-6-412. Highway-specific Restrictions, Requirements, Conditions, and Allowances .....34

Table 4. Permanent Highway Restrictions, Requirements, Conditions, and Allowances .....35

R17-6-413. Renumbered .....72

Table 5. Renumbered .....72

R17-6-414. Renumbered .....72

R17-6-415. Emergency Expired .....72

**ARTICLE 5. ENVELOPE PERMIT SPECIAL PROVISIONS**

*Article 5, consisting of Sections R17-6-501 through R17-6-505, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).*

Section

R17-6-501. General Provisions; Definitions .....72

R17-6-502. Envelope Permit - Non-specific and Non-reducible Vehicle or Load .....72

R17-6-503. Envelope Permit - General Application Procedure .....73

R17-6-504. Envelope Permit - Class C Tridem Axle Group Configurations .....73

R17-6-505. Envelope Permit - Trip Authorization Process for Tridem Axle Group Configurations .....74

R17-6-506. Page-Lake Powell Area Houseboat Hauling Envelope Permit .....74

R17-6-507. Envelope Permit Required Recordkeeping .....74

R17-6-508. Envelope Permit Suspension Point System .....74

R17-6-509. Envelope Permit Suspension; Revocation; Enforcement .....75

R17-6-510. Notice of Point Assessment, Denial, Suspension, or Revocation .....75

R17-6-511. Envelope Permit Reapplication .....75



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

## ARTICLE 1. GENERAL PROVISIONS

*Article 1, consisting of Sections R17-6-101 through R17-6-112, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).*

**R17-6-101. General Provision; Definitions; Time of Day**

- A. General Provision.** The Department shall issue and regulate oversize and overweight special permits as provided under this Chapter. The Department implements these Sections under authority of A.R.S. §§ 28-366, 28-1103, 28-1104, and 28-7045, in collaboration with the Overdimensional Permit Council as prescribed under A.R.S. § 28-1150.
- B. Definitions.** In addition to the definitions prescribed under A.R.S. §§ 28-101 and 28-601, the following terms apply to this Chapter, unless otherwise specified:

“AASHTO” means the American Association of State Highway Transportation Officials.

“ADOT” means the Arizona Department of Transportation.

“Applicant” means a person or entity seeking to obtain a special permit or envelope permit from the Department under A.R.S. Title 28, Chapter 3, Article 18 or 19, and this Chapter.

“Appurtenance” means any not readily removable manufacturer-installed or dealer-installed fixture attached to a vehicle or load that increases a peripheral dimension of the vehicle or load.

“Arizona Central Commercial Permits Office” means the statewide ADOT ECD office identified on the Department’s website as a location available for oversize and overweight special permit and envelope permit information, application, and issuance.

“Cargo carrying unit” has the same meaning as prescribed under A.R.S. § 28-1103.

“Certified law enforcement officer” means a person who is an active duty Arizona peace officer standards and training board certified peace officer.

“Class C Unit” means the statewide ADOT office for class C oversize and overweight special permit applications and information:

206 S. 17th Avenue, Mail Drop 004R  
Phoenix, AZ 85007  
Voice: (602) 712-8176 or (602) 712-8280  
Fax: (602) 712-3380  
Internet: [www.azdot.gov](http://www.azdot.gov)

“Combination of vehicles” has the same meaning as prescribed under A.R.S. § 28-101, which does not include a mobile home.

“Continuous travel” means the ability to operate or transport an oversize, overweight, or oversize and overweight special permitted vehicle that meets all of the size and weight parameters provided by the Department under R17-6-205(B), R17-6-401(A), and R17-6-412, Table 4, at any time, 24 hours a day, seven days a week.

“Department’s website” means [www.azdot.gov](http://www.azdot.gov).

“ECD” means the Enforcement and Compliance Division of the Arizona Department of Transportation.

“Emergency vehicle” and “Emergency response vehicle” mean the same as prescribed under 23 U.S.C. § 127,

which includes a vehicle designed to be used under emergency conditions to:

Transport personnel and equipment; and

Support the suppression of fires and mitigation of other hazardous situations.

“Envelope” has the same meaning as prescribed under A.R.S. § 28-1141, and encompasses the outermost dimensions of a vehicle or vehicle and load combination as prescribed under A.R.S. § 28-1144, without exceeding the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411.

“Envelope permit” has the same meaning as prescribed under A.R.S. § 28-1141, and as further prescribed under A.R.S. § 28-1144, which when issued by the Department for a vehicle or vehicle and load combination:

Restricts all loads to non-reducible only,

Allows unlimited trips within the permit’s period of validity,

Allows the permitted carrier unlimited load changes,

Requires each transported load to meet all envelope dimensional criteria,

Restricts operation to certain routes, and

Makes the permit inapplicable for use in transporting a modular or mobile home.

“Escort” has the same meaning as prescribed under A.R.S. § 28-601, “escort vehicle.”

“Established place of business” means a permanent site or location where an oversize or overweight special permit or envelope permit holder conducts business.

“Highway” has the same meaning as prescribed under A.R.S. § 28-101, “street” or “highway.”

“Highway feature” means a roadway, structure, traffic control device, right-of-way, or any item connected with highway travel.

“Houseboat” means any large non-reducible watercraft, including a yacht, which when hauled on a vehicle issued an envelope or special permit by the Department as provided under A.R.S. § 28-1144(B), and this Chapter, will not exceed any allowable size or weight indicated on the permit.

“IFTA license” means an interstate user license issued by an applicant’s base jurisdiction for fuel tax purposes under the International Fuel Tax Agreement as provided under A.R.S. Title 28, Chapter 16, Article 2, for operation of a use class motor vehicle that is not a recreational vehicle, but is a motor vehicle or vehicle combination designed, used, or maintained primarily for the transportation of persons or property, and:

Has two axles and a gross vehicle weight rating or declared gross vehicle weight of 26,001 pounds or more;

Has three or more axles regardless of weight; or

Has a gross combined weight rating or declared gross combined weight of 26,001 pounds or more.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

“Interstate Highway System” means any segment of the Dwight D. Eisenhower System of Interstate and Defense Highways located within the boundaries of this state, officially designated by the state transportation board, and approved by the United States Secretary of Transportation pursuant to 23 United States Code.

“Law enforcement escort” means a uniformed certified law enforcement officer in a fully marked patrol vehicle that accompanies an oversize or overweight special permitted vehicle.

“LCV” means longer combination vehicle, which has the same meaning as prescribed under 23 CFR 658.5.

“Legal weight” means within the maximum gross weight limitations prescribed under A.R.S. § 28-1100 and R17-6-102, Table 1.

“Mobile home” has the same meaning as prescribed under A.R.S. § 28-2001, which may include a mobile home, a manufactured home, or a factory-built building as more specifically prescribed under A.R.S. § 41-4001, if used in the same context as a mobile home prescribed under A.R.S. § 28-2001.

“Motor home” has the same meaning as prescribed under A.R.S. § 28-4301.

“Mountain Standard Time” means the standard time in Arizona as prescribed under 49 CFR 71 and A.R.S. § 1-242.

“National Network” has the same meaning as prescribed under A.R.S. § 28-1092, designated under A.R.S. § 28-1093(C), and detailed under:

23 CFR 658, Appendix A, for movement of a vehicle, combination of vehicles, or vehicle and load combination exceeding an overall length or width limitation provided under R17-6-102, Table 1; or

23 CFR 658, Appendix C, and A.R.S. § 28-1095(F), for movement of longer combination vehicles exceeding a size or weight limitation provided under R17-6-102, Table 1.

“Natural forest products” include raw or unfinished logs, timber, pulpwood, biomass, wood chips, etc.

“Non-articulated” means any segment of a vehicle or combination of vehicles constructed or configured without hinged mechanisms, bendable joints, or other flexible points of pivot, swivel, or turning, which may hinder or prevent vertical or horizontal movement during transport or while attempting to negotiate turns.

“Non-reducible” or “non-reducible load or vehicle” has the same meaning as prescribed under 23 CFR 658.5, “nondivisible load or vehicle,” which applies to any load or vehicle exceeding an applicable length or weight limit that if separated into smaller loads or vehicles would:

Compromise the intended use of the vehicle, i.e., make it unable to perform the function for which it was intended;

Destroy the value of the load or vehicle, i.e., make it unusable for its intended purpose; or

Require more than eight workhours to dismantle using appropriate equipment, with the applicant having the burden of proof as to the number of work-hours required to dismantle the load.

“Oversize” means a size of vehicle, combination of vehicles, or vehicle and load combination that exceeds a maximum legal size limitation provided under A.R.S. Title 28, Chapter 3, Article 18 or 19.

“Over-the-road bus” has the same meaning as prescribed under A.R.S. § 28-1099.

“Overweight” means a weight of vehicle, combination of vehicles, or vehicle and load combination that exceeds a maximum legal weight limitation provided under A.R.S. Title 28, Chapter 3, Article 18 or 19.

“Permittee” means a person or entity to whom the Department issues an oversize or overweight special permit or envelope permit under this Chapter, and who is responsible for meeting the obligations, responsibilities, and specifications indicated on the permit.

“Person” has the same meaning as prescribed under A.R.S. § 28-5201.

“Power unit” has the same meaning as prescribed under A.R.S. § 28-1141.

“Public weighmaster” has the same meaning as prescribed under A.R.S. § 3-3401.

“Special permit” means a document issued by the Department under A.R.S. § 28-1103, which authorizes a permittee or driver to operate or transport an oversize, overweight, or oversize and overweight vehicle, combination of vehicles, or vehicle and load combination on the State Highway System, subject to the terms and conditions of the permit issued.

“Special permitted vehicle” means the vehicle, combination of vehicles, or vehicle and load combination described to the Department by a special permit applicant on application for a special permit, as required under A.R.S. § 28-1104, the description of which is then recorded on the Department’s computer systems for analysis, approval, and subsequent documentation on any special permit issued by the Department.

“Specified load” means the dimensions and weights a special permit applicant declares to the Department, as provided under A.R.S. § 28-1104, regarding any item or series of items to be transported throughout an entire permit period.

“State Highway System” means all state routes and state highways owned, operated, and maintained by the Department as designated by the state transportation board under A.R.S. § 28-304(B)(2), including all U.S. routes and Interstate highways located within the boundaries of this state.

“Sunrise” and “sunset” have the same meaning and daily calculation as prescribed by the United States Naval Observatory (USNO), which:

The Department uses to determine normal permit transport start and stop times as provided under R17-6-401; and

An interested person may access online at [aa.usno.navy.mil](http://aa.usno.navy.mil), or in hardcopy format from the Arizona Central Commercial Permits Office or any Arizona Port of Entry location listed on the Department’s website.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

“Tandem axle” has the same meaning as prescribed under A.R.S. § 28-1100(B).

“TI” means traffic interchange, which is a junction of roadways arranged to allow for the free flow of traffic uninterrupted by crossing traffic routed over or under the main roadway.

“Towaway trailer transporter combination” means a combination of vehicles consisting of a trailer transporter towing unit and two trailers or semitrailers as inventory of the trailer or semitrailer manufacturer, distributor, or dealer, and the total weight of the combination plus any property carried does not exceed 26,000 pounds.

“Trailer transporter towing unit” means a power unit that is not used to carry property when in a towaway trailer transporter combination.

“Tridem axle” means a group of three axles connected by a common suspension system, or any three consecutive axles whose extreme centers may be included between parallel transverse vertical planes spaced nine to 14 feet apart, extend across the width of the vehicle, and are individually attached to, or articulated from, a common attachment to the vehicle, or are designed to automatically equalize the load between the three axles.

“USDOT number” means the motor carrier identification number, assigned to a company by the U.S. Department of Transportation’s Federal Motor Carrier Safety Administration, preceded by the letters USDOT.

“Use class motor vehicle” has the same meaning as prescribed under A.R.S. § 28-5601.

“UX” means a temporary highway or route segment designated by the Department as:

A segment of highway no longer part of the mainline U.S. system of highways, but still owned and maintained by the Department; or

A portion of a U.S. Route affected by mining operations and subject to realignment by the mining company as the mine expands operations.

“Watercraft” has the same meaning as prescribed under A.R.S. § 5-301 that is properly registered with the Arizona Game and Fish Department or the U.S. Coast Guard.

- C. Time of Day. In this Chapter, a time of day prescribed is Mountain Standard Time as defined under subsection (B) except where a route on the State Highway System traverses a tribal nation that adopts Daylight Saving Time under 49 CFR 71.2.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 13 A.A.R. 866, effective March 6, 2007 (Supp. 07-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-102. Threshold Dimensions; Special Permit Exemptions**

- A. Unless exempt under this Section or A.R.S. § 28-1091(C), § 28-1093(D), or § 28-1095(A)(6), a person shall obtain and carry an oversize or overweight special permit issued by the Department under this Chapter if transporting a vehicle or load exceeding any dimension provided under Table 1 using any route on the State Highway System.
- B. A permittee and a driver of an oversize or overweight special permitted vehicle shall comply with all applicable:
1. Safety requirements provided under Article 3, and
  2. Transport provisions provided under Article 4.
- C. An oversize or overweight special permit is not required if crossing a route on the State Highway System at a level grade and no highway structures are involved.
- D. An oversize or overweight special permit is not required for snow removal equipment operated by one of the following:
1. An Arizona state agency,
  2. An Arizona county,
  3. An Arizona city, or
  4. An Arizona municipality other than a city.
- E. The special permit exemption provided under subsection (D) applies only to snow removal equipment traveling on its own wheels and:
1. Operating for the purpose of clearing snow or ice,
  2. Traveling to a facility for repair, or
  3. Traveling to a location used for the purpose of loading or unloading de-icing materials.
- F. The operator of an oversize or overweight vehicle exempt from the special permit requirement under this Section shall comply with all applicable safety requirements provided under Article 3 unless otherwise prescribed by statute.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**Table 1. Threshold Dimensions**

The Department may issue an applicable class of special permit, as provided under Article 2, for transporting on the State Highway System a vehicle, combination of vehicles, or vehicle and load combination exceeding any of the following maximum limits:

Width (A.R.S. § 28-1093)		Height (A.R.S. § 28-1094)	
8' 6" (8' if the maximum width of the route is further restricted under R17-6-412, Table 4)		14' (13' 6" if the maximum height of the route is further restricted under R17-6-412, Table 4)	
<b>Length (A.R.S. §§ 28-1095 and 28-1097 and 23 CFR 658.13)</b>			
Legal for travel on the State Highway System, the Interstate Highway System, the federally-designated National Network of highways and routes listed under 23 CFR 658, App. A, and other highways and routes located within ten miles of an Interstate highway.			
Overhang	Front of vehicle	3'	
	Rear of vehicle or trailer	6'	
Straight truck		40'	
Bus, or recreational vehicle as defined in A.R.S. § 41-4001(30)(b), if non-articulated		45'	
Truck equipped with a conveyor bed and used solely as a fiber and forage module mover		48'	
Truck tractor - semitrailer combination		National Network	57' 6" semitrailer
Truck-tractor - semitrailer - forklift combination			
Truck tractor - semitrailer combination		All other highways and routes of the State Highway System	53' semitrailer; or 65' overall combination if semitrailer is more than 53'
Truck-tractor - semitrailer - forklift combination			
Truck tractor - semitrailer - trailer combination		28' 6" per semitrailer or trailer; or 65' overall combination	
Truck tractor - semitrailer - semitrailer combination (B-train)			
Truck - trailer combination		28' 6" trailer; or 65' overall combination	
Truck - forklift combination			
Truck - semitrailer combination			
Bus or trolley coach, if articulated		60' overall combination	
Pole trailer with non-reducible load (e.g., poles, pipes, structural material, etc.)		80' cargo carrying length	
Vehicle or boat transporter combination (stinger-steered)		80' overall combination*	
*Measurement of overall combination excludes extendable ramps and an overhang allowance of 4' to the front of the vehicle and 6' to the rear of the semitrailer			
Towaway trailer transporter combination		82' overall combination	
Drive-away saddle-mount vehicle transporter combination with up to three saddle-mounted vehicles (may include one fullmount)		97' overall combination	
<b>Weight (A.R.S. §§ 28-1099 and 28-1100 and 23 U.S.C. § 127)</b>			
Legal for travel on the State Highway System, the Interstate Highway System, the federally-designated National Network of highways and routes listed under 23 CFR 658, App. A, and other highways and routes located within ten miles of an Interstate highway. Legal weight shall be determined using the listed limits or the manufacturer's weight rating, whichever is less.			
Steering axle		20,000 lbs.	
Single axle		20,000 lbs.	
Single axle for a motor home; over-the-road bus; or vehicle regularly and exclusively used as an intra-state public agency transit passenger bus		24,000 lbs.	
Towaway trailer transporter combination		26,000 lbs. overall combination	
Vehicle combination of five axles or more with axle group weights computed using the formula prescribed under A.R.S. § 28-1100(A)(4)		80,000 lbs. overall combination	
An electric powered vehicle or a vehicle with an engine fueled primarily by natural gas may exceed any vehicle weight limit (up to a maximum gross vehicle weight of 82,000 pounds) as provided under 23 U.S.C. 127, by an amount that is equal to the difference between the weight of the vehicle attributable to the electric battery system, or the natural gas tank and fueling system carried by that vehicle, and the weight of a comparable diesel tank and fueling system.			

**Historical Note**

New Table 1 made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-103. General Application Procedure for Special Permits**

- A.** Unless otherwise provided in this Chapter, an applicant may apply to the Department as provided under subsection (B) for an oversize, overweight, or oversize and overweight special permit to transport a specific non-reducible vehicle, combination of vehicles, or vehicle and load combination that does not exceed:
1. A class A oversize and overweight special permit limitation provided under R17-6-201;
  2. A class C - Tridem special permit limitation provided under R17-6-212; or
  3. Any other applicable State Highway System restriction, condition, or allowance prescribed by the Department under R17-6-412, Table 4.
- B.** An applicant may request a special permit prescribed under subsection (A), by:
1. Completing the electronic application process provided on the Department's website; or
  2. Completing an oversize/overweight special permit application form, provided by the Department on its website, and mailing or delivering the written application to the address indicated on the application.
- C.** Unless otherwise provided in this Chapter, an applicant may request from the Class C Unit a class C special permit, class C - Mobile Home special permit, or Easy C - Mobile Home special permit to transport a specific non-reducible vehicle, combination of vehicles, or vehicle and load combination that exceeds a limit provided under subsection (A), by:
1. Completing the electronic application process provided on the Department's website, or completing a class C oversize/overweight special permit application form, provided by the Department on its website, and mailing the written application to the Class C Unit as indicated on the application; and
  2. Following all additional application procedures provided under R17-6-104 and R17-6-211, as applicable.
- D.** An applicant requesting a special permit to transport a self-propelled mobile crane, drilling rig, or similar specialty equipment shall additionally follow the application procedures provided under R17-6-205.
- E.** An applicant requesting a special permit to transport an LCV shall follow the application procedures provided under R17-6-206.
- F.** An applicant requesting an envelope permit shall follow the application procedures provided under Article 5, of this Chapter.
- G.** Unless otherwise provided under this Chapter, an applicant for an oversize or overweight special permit shall provide to the Department, at the time of application, all applicable fees and information required by the Department for issuance of an appropriate class of permit, including:
1. Motor carrier related information:
    - a. Name and address of the applicant's principal or established place of business;
    - b. Name, phone number, and email address of an official company representative; and
    - c. USDOT number;
  2. Power unit related information:
    - a. Vehicle make, body style, and year;
    - b. Vehicle identification number;
    - c. Unit number assigned;
    - d. License plate number; and
    - e. Base jurisdiction - state of registration;
  3. Vehicle and load combination related information:
    - a. Trailer plate number or numbers;
    - b. Total number of axles;
    - c. Overall gross weight;
    - d. Overall length, width, and height; and
    - e. Length of front and rear overhang if applicable;
  4. Load related information:
    - a. Specific load description;
    - b. State and federal routes requested;
    - c. Starting and ending location within the state;
    - d. If the load is overweight:
      - i. Axle spacing measurements,
      - ii. Axle width measurements,
      - iii. Number of tires per axle,
      - iv. Weight measurements per axle, and
      - v. Width of each tire;
  5. Load related information for movement of a mobile home shall additionally include:
    - a. Manufacturer's name;
    - b. Brand name or model;
    - c. Complete serial number assigned; and
    - d. Evidence of payment of all applicable ad valorem taxes as required under A.R.S. § 28-1104 in the form of a Mobile Home Property Tax Clearance 504 issued by the county in which the mobile home is currently located if movement of the mobile home is being conducted for a reason other than an original sale, exchange, or lease-purchase to a consumer.
  6. Proof of valid registration that complies with the requirements of A.R.S. § 28-2153; and
  7. Proof of a valid IFTA license that complies with the requirements of A.R.S. § 28-5742, if applicable.
- H.** An applicant for an oversize or overweight special permit shall certify to the Department that all information provided on the application is true and correct.
- I.** For the purposes of oversize or overweight special permit application and issuance under this Article for travel on the State Highway System, the term "non-reducible load or vehicle" may include any of the following vehicles, or vehicle and load combinations:
1. Casks designed for the transport of spent nuclear materials;
  2. Emergency vehicles or emergency response vehicles, including those loaded with salt, sand, chemicals or a combination thereof, with or without a plow or blade attached in front, and being used for the purpose of spreading the material on highways that are or may become slick or icy;
  3. Military vehicles transporting marked military equipment or material;
  4. Bulk milk transport tankers or trucks carrying fluid milk products; and
  5. Vehicles or vehicle and load combinations transporting or removing natural forest products or biomass from certain areas within this state, subject to all terms and conditions set by the Department on issuance of a special permit, as provided under R17-6-207.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-104. Additional Special Permit Requirements and Restrictions; Engineering Analysis**

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

- A. To promote safe transport of oversize and overweight vehicles, combinations of vehicles, or vehicle and load combinations, the Department's Class C Unit shall evaluate each class C special permit application to determine, on a case-by-case basis, whether additional permit requirements or restrictions are appropriate and necessary as a condition of permit approval. The Department's decision to require additional permit restrictions shall be based on its consideration of:
1. Bridge capacities;
  2. Load size and weight;
  3. Pavement stress;
  4. Road width, grade, and condition; and
  5. Traffic dynamics of the proposed route.
- B. The Department shall require a special permit applicant to obtain an engineering analysis for transport of an overweight vehicle, combination of vehicles, or vehicle and load combination:
1. Exceeding 250,000 pounds;
  2. Exceeding the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411; or
  3. Exceeding a bridge weight restriction provided under R17-6-412, Table 4.
- C. If the Department requires an engineering analysis of a proposed route as a condition of permit approval, and is unable to dedicate the employee resources necessary to timely complete the required analysis, a special permit applicant may obtain an analysis prepared by a non-Department engineer at the applicant's own expense.
1. An engineer registered by the Arizona State Board of Technical Registration in structural or civil engineering, as prescribed under A.R.S. Title 32, Chapter 1, shall prepare an engineering analysis of the proposed route according to industry standards.
  2. The special permit applicant shall submit to the Department for review any engineering analysis prepared by a non-Department engineer.
  3. An engineering analysis is considered by the Department to be compliant with industry standards if prepared according to the following publications, available on the Department's website:
    - a. The most recently published edition of the AASHTO Manual for Bridge Evaluation, including all interims, standards, or guidelines;
    - b. The most recently published edition of the AASHTO Load and Resistance Factor Design (LRFD) - Bridge Design Specifications, including all interims, standards, or guidelines; and
    - c. The ADOT Bridge Load Rating Guidelines and Bridge Design Guidelines.
  4. The non-Department engineer shall certify that an applicant's overweight vehicle will not overstress or damage any element of:
    - a. A highway structure, or
    - b. Any other state property.
- D. An applicant for a class C special permit shall submit to the Department, at the time of special permit application, all applicable fees required under R17-6-211 for preparation or review of an engineering analysis.
- E. An applicant for a class C special permit may resubmit an engineering analysis approved by the Department within the previous 12 months if:
1. The size and weight of the applicant's vehicle and load are identical to the previously approved permit application;
  2. The segments of the applicant's proposed route are within the outer limits of the previously approved route; and
  3. The condition of the highway structure or other state property has not changed.
- F. The Department shall conduct a separate review and approval process for each engineering analysis submitted under this Section.
- G. If the applicant's engineering analysis shows that a highway structure will not support the overweight vehicle as requested, the Department shall deny the application for a class C special permit.
- H. If the Department determines that a potential traffic safety risk exists, a class C special permit applicant shall submit to the Department a route survey and contingency plan as provided under R17-6-108.
- I. The Department of Transportation, the Department of Public Safety, or any other law enforcement entity lawfully authorized to provide certified weights may weigh a class C special permitted vehicle and load exceeding 250,000 pounds, or require the applicant to have the vehicle and load weighed as prescribed under A.R.S. § 28-1102.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-105. Special Permit Limitation**

An applicant or permittee may apply to the Department for a special permit to transport an oversize, overweight, or oversize and overweight vehicle or vehicle and load combination on any part of the State Highway System as provided under this Chapter. An applicant or permittee shall apply separately with other applicable political subdivisions or tribal nations for permission to operate on a county, municipal, or tribal route.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-106. Special Permit Extension**

- A. Upon request by a permittee, the Department may authorize a one-time extension of up to four days for a single-trip special permit if:
1. The permittee needs to exchange a permitted vehicle for another due to mechanical failure, or
  2. Transport by the permitted vehicle is delayed by inclement weather.
- B. Except as provided under subsection (C), a permittee may request and receive authorization for the extension provided under subsection (A) by contacting the Department at the telephone number indicated on the special permit.
- C. A special permit extension authorization for a class C special permit is only available through the Class C Unit and may be requested by contacting the Department at the telephone number indicated on the special permit.
- D. A special permit extension request due to mechanical failure shall include:
1. A written statement from the repair facility, on company letterhead, referencing the necessary repairs; and

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

2. Any new power unit and registration numbers, if applicable.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-107. Special Permit Confiscation**

- A. Except as provided under subsection (B), a peace officer designated by the Director under A.R.S. § 28-369 may confiscate an oversize or overweight special permit before its expiration date if the permittee or driver is cited for a violation of this Chapter or A.R.S. Title 28, Chapter 3, Article 18.
- B. The Director may suspend, revoke, and retrieve an envelope permit as provided under A.R.S. § 28-1147 and R17-6-509.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-108. Route Survey and Contingency Plan**

- A. To promote safe transport of oversize and overweight vehicles, combinations of vehicles, or vehicle and load combinations, the Department shall evaluate each class C special permit application on a case-by-case basis, to determine whether a potential traffic safety risk exists that may require a route survey and contingency plan as a condition of permit approval. The Department's decision to require a route survey and contingency plan shall be based on its consideration of:
1. Bridge capacities;
  2. Load size and weight;
  3. Pavement stress;
  4. Road width, grade, and condition; and
  5. Traffic dynamics of the proposed route.
- B. If the Department determines that a potential traffic safety risk exists, a class C special permit applicant shall submit to the Class C Unit at the time of application, a route survey and contingency plan, which shall address all of the following items:
1. Identify all roadway features located along the proposed route that may inhibit movement of the vehicle, combination of vehicles, or vehicle and load combination;
  2. Identify all obstructions that may be subject to potential disturbance or damage;
  3. Specify how all structures, delineators, foliage, and official traffic control devices will be managed or avoided;
  4. Specify all available pullout points located along the proposed route listed by highway and milepost number;
  5. Specify how all side traffic will be managed;
  6. Specify the rate of speed at which the load will travel along the proposed route;
  7. Specify the approximate times during which the load is expected to be in transit;
  8. Specify the plan to be followed in the event of a breakdown; and
  9. Indicate the estimated time needed to change out a power unit or other special equipment if the Department, through detailed analysis and as a condition of permit approval, requires the use of an additional power unit or other special equipment to ensure safe transport of the proposed load. The Department's decision to require an

additional power unit or other special equipment shall be based on its consideration of the:

- a. Estimated timing involved with clearing a route after a breakdown;
- b. Expected weather conditions;
- c. Proximity and availability of reserve resources;
- d. Size and weight of the load;
- e. Traffic dynamics of the proposed route; and
- f. Width, grade, and condition of the roads.

- C. As a condition of class C special permit issuance, the Department may require an applicant to coordinate use of one or more law enforcement escorts as needed to ensure public safety while transporting a proposed load.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-109. Special Permit Denial**

The Department shall deny an oversize or overweight special permit application, or revoke and confiscate a previously approved special permit, if:

1. The proposed transport route or a structure on the route is:
  - a. Unable to bear the size or weight of the transport vehicle and load according to the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411,
  - b. Under repair, or
  - c. Temporarily closed due to a hazardous condition listed under R17-6-405;
2. An applicant for a permit to transport a mobile home does not provide written proof of ad valorem tax payment or clearance as required under A.R.S. § 28-1104; or
3. The Department determines that the special permit applicant made a material misrepresentation or misstatement on the permit application or any other document submitted to the Department in support of the permit application.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-110. Liability**

A person who operates an oversize or overweight special permitted vehicle and a person who causes the vehicle to be operated shall be liable for any damage caused to a state highway by the oversize or overweight vehicle or load during transport as provided under A.R.S. § 28-1107.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**R17-6-111. Administrative Hearing**

If the Department denies an oversize or overweight special permit application, or revokes and confiscates a previously issued special

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

permit, the permittee may appeal the action using the procedure provided under 17 A.A.C. 1, Article 5.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**R17-6-112. Emergency Operation Provision**

- A. For a statewide or local emergency that affects public welfare or safety, according to general powers under A.R.S. §§ 28-363(A)(5) and 28-364(B), the Director may authorize transport of an oversize or overweight vehicle or load without a special permit for purposes of relief or repair.
- B. For a national emergency, the Director may issue a special permit authorizing operation of a reducible oversize or overweight vehicle, or vehicle and load combination, on the Interstate Highway System if the President has declared an emergency or a major disaster under 42 U.S.C. § 5121. A special permit provided by the Department under this subsection shall be:
  - 1. Issued in accordance with all applicable state laws;
  - 2. Issued exclusively for delivering relief supplies or providing other direct assistance in efforts to help alleviate any damage, loss, hardship, or suffering caused by such event; and
  - 3. Issued to expire not later than 120 days after the date on which the President declares the emergency or major disaster, whichever declaration occurred first.
- C. Authorization for emergency operation under this Section may be obtained by contacting the Department’s Traffic Operations Center at 1-800-379-3701.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-113. Electronic Access to Local Permit Ordinances and Rules**

- A. A local authority that issues oversize and overweight special permits under A.R.S. § 28-1103, and this Chapter, shall provide to the Department’s Class C Unit, a web link the public may use to electronically access the local authority’s current ordinances and rules relating to excess size and weight special permits.
- B. The Department shall immediately post each web link received from a local authority under subsection (A) and A.R.S. § 28-1103 to its website at [www.azdot.gov](http://www.azdot.gov).
- C. A local authority shall provide, to the Department’s Class C Unit, an electronic copy of all ordinances adopted and enforced by the local authority with respect to highways under its jurisdiction as required under A.R.S. § 28-1103(F), as follows:
  - 1. Email one copy of all applicable local ordinances formatted as a word document (.doc, .docx, .rtf, .pdf, etc.) to [StatewidePermits@azdot.gov](mailto:StatewidePermits@azdot.gov); and
  - 2. Email one copy of any change the local authority is considering, proposing, or making to any applicable local ordinance to [StatewidePermits@azdot.gov](mailto:StatewidePermits@azdot.gov).
- D. If a local authority informs the Department of an urgent need for an ordinance to be posted to the Department’s website for the protection of public safety, the Department may post the information to its website as proposed, and forward an elec-

tronic copy of the proposed ordinance to the Overdimensional Permit Council for further review as required by law.

**Historical Note**

New Section made by final rulemaking at 13 A.A.R. 866, effective March 6, 2007 (Supp. 07-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**ARTICLE 2. SPECIAL PERMIT CLASSES AND FEES**

Article 2, consisting of Sections R17-6-201 through R17-6-210, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

**R17-6-201. Class A Oversize and Overweight Special Permit - Specific Non-reducible Vehicle, Load, or Combination**

- A. The Department shall issue a single trip, multiple trip, or annual class A oversize, overweight, or oversize and overweight special permit according to the following criteria for a specific non-reducible vehicle, combination of vehicles, or vehicle and load combination that exceeds a dimension provided under R17-6-102, Table 1, but does not exceed the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411, or any of the following maximum limits:

Vehicle or load description	A specific non-reducible vehicle or load over a threshold dimension provided under R17-6-102, Table 1, to a maximum:	
	Width	14 feet
	Height	16 feet
	Overall length	120 feet
	Weight	250,000 lbs.
Standard permit fee for weight not exceeding 80,000 pounds (A.R.S. § 28-1105)	Single trip: 96-hour maximum	\$15
	Multiple trip: 30-day maximum	\$30
	Multiple trip: one year	\$360
Overweight permit fee for weight exceeding the legal threshold under R17-6-102, Table 1, but not exceeding 250,000 pounds (A.R.S. § 28-1105)	Single trip	\$75
	Multiple trip: 30-day maximum	\$75
	Multiple trip: one year	\$600

- B. An applicant for a class A oversize, overweight, or oversize and overweight special permit shall apply to the Department and submit appropriate fees using the application procedure provided under R17-6-103.
- C. A permittee or driver of an oversize, overweight, or oversize and overweight special permitted vehicle, shall not access a route listed under R17-6-412, Table 4, unless operating in full compliance with all indicated restrictions and requirements.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-202. Repealed**



CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Repealed by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-203. Class A - Oversize Recreational Vehicle Special Permit - Commercial Transport**

A. The Department shall issue a class A - Oversize Recreational Vehicle special permit according to the following criteria for a commercial transporter of a recreational vehicle that exceeds the width threshold prescribed under A.R.S. § 28-1093 and R17-6-102, Table 1, but does not exceed the following maximum limit:

Vehicle or load description	A dealer, manufacturer, or transporter hauling or driving on behalf of a dealer, manufacturer, or consumer a recreational vehicle that exceeds the legal width threshold provided under R17-6-102, Table 1, but is otherwise in conformance with configuration requirements provided under A.R.S. § 28-1093 for excess width attributable to recreational vehicle appurtenances.	
-----------------------------	--	--

Standard permit fee for weight not exceeding 80,000 pounds (A.R.S. § 28-1105)	Multiple trip: 30-day maximum	\$30
	Multiple trip: one year	\$360*

\*For each original annual permit purchased, the Department may issue up to 24 additional copies of that permit, all of which are valid for unlimited use by the permittee throughout the permitted period for an unlimited number of vehicles.

- B. An applicant for a class A - Oversize Recreational Vehicle special permit shall apply to the Department and submit appropriate fees using the application procedure provided under R17-6-103.
- C. A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under R17-6-412, Table 4, unless operating in full compliance with all indicated restrictions and requirements.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-204. Renumbered**

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). R17-6-204 renumbered to R17-6-211 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-205. Class A - Crane Oversize and Overweight Special Permit - Self-propelled Mobile Crane, Drilling Rig, or Similar Specialty Equipment**

A. The Department shall issue a class A oversize, overweight, or oversize and overweight special permit for a specific non-reducible self-propelled mobile crane, drilling rig, or similar specialty equipment that exceeds a dimension provided under

R17-6-102, Table 1, but is within the class A maximum limits prescribed under R17-6-201.

- B. Unless restricted under R17-6-404 or R17-6-412, Table 4, a permittee or driver of a self-propelled mobile crane, drilling rig, or similar specialty equipment issued a special permit under this Section is eligible for continuous travel if the specialty equipment does not exceed any of the following dimensions:
  1. 11 feet in width;
  2. 14 feet 6 inches in height;
  3. 10 feet in length of front overhang;
  4. 10 feet in length of rear overhang;
  5. 120 feet in overall length; or
  6. 250,000 pounds.
- C. An applicant for a class A - Crane special permit under this Section shall submit to the Department, with all appropriate fees, an application form provided by the Department that includes all of the following information:
  1. Specific dimensions of the vehicle and load combination, including:
    - a. A detailed description;
    - b. A detailed drawing that illustrates all of the following:
      - i. Axle spacing;
      - ii. Axle weight;
      - iii. Axle width;
      - iv. Tires per axle;
      - v. Tire width as designated by the manufacturer;
      - vi. Maximum width to the outside of the axles, excluding any load-induced tire bulge; and
      - vii. Load weight;
    - c. A detailed listing of all equipment to be included, such as counterweights, outriggers, boom position, position of boom dolly, etc.; and
    - d. A table of loads supplied by the manufacturer listing component and total weights;
  2. Proof of gross weight:
    - a. For an initial application, a public weighmaster's certificate of weight and measure issued at a certified public scale once the vehicle is equipped and set for highway travel; or
    - b. For a renewal application, a certification by the applicant that no dimension has changed and the vehicle does not exceed the originally certified dimensions or weights;
  3. Proof of valid registration that complies with the requirements of A.R.S. § 28-2153;
  4. Proof of a valid IFTA license that complies with the requirements of A.R.S. § 28-5742 if applicable; and
  5. Documentation of any applicable encroachment permit obtained under 17 A.A.C. 3, Article 5, if the applicant must temporarily move any state-owned highway feature as part of a planned transport.
- D. The permittee and driver are responsible for ensuring that the dimensions and weights of a special permitted vehicle remain in compliance with the dimensions and weights certified by the permittee to the Department on application for the permit, and that all permit restrictions indicated by the Department on the special permit are followed. Violation of the terms of a permit in size, weight, length, height, boom position, dolly position, trailer position, or any other restriction indicated on the permit shall render the permit invalid and no permit fee or portion thereof will be refunded. Special permits are non-transferable and non-refundable.
- E. A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under R17-6-412, Table 4,

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

unless operating in full compliance with all indicated restrictions and requirements.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-206. Class E Oversize and Overweight Special Permit - Reducible Multiple Trailer LCV**

- A. The Department shall issue a class E oversize or overweight special permit according to the types and restrictions listed under Table 2 for transporting reducible loads on the National Network using an LCV consisting of a truck, or truck tractor with semitrailer, and one or more trailing units.
- B. The Department shall issue a class E oversize or overweight special permit for an LCV only at the following state ports of entry:
  1. Page,
  2. St. George, or
  3. Teec Nos Pos.
- C. An applicant for a class E oversize or overweight special permit shall submit to the Department, with all appropriate fees, an application form provided by the Department that includes all of the following information:
  1. Specific dimensions of the vehicle and load combination;
  2. Proof of valid registration that complies with the requirements of A.R.S. § 28-2153;
  3. Proof of a valid IFTA license that complies with the requirements of A.R.S. § 28-5742, if applicable; and

- 4. Other information as needed by the Department to issue an appropriate permit, which includes:
  - a. Company name;
  - b. Company or terminal address;
  - c. Company USDOT #;
  - d. Company mailing address;
  - e. Company contact name, address, telephone number, and fax number or email address;
  - f. Company representative's name and title; and
  - g. Specific routes requested.
- D. A person who operates, and a person who causes to be operated, an oversize or overweight special permitted vehicle shall be jointly responsible for meeting all permit requirements.
- E. The permittee or driver of a class E special permitted vehicle and load combination shall comply with the federal bridge formula axle group weight limitations provided under A.R.S. § 28-1100(A)(4) and any other applicable State Highway System restrictions, conditions, or allowances provided by the Department under R17-6-412, Table 4.
- F. A permittee or driver shall not operate any other trailer configuration or multiple trailer combination under the class E special permit, unless authorized by the Department and specifically indicated on the permit.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Table 2. Class E LCV Special Permit and Issuance Criteria**

<b>LCV Double</b> Truck tractor and two trailing units, or truck and one trailing unit, exceeding an overall combination length of 65'. <b>LCV Triple*</b> Truck tractor and three trailing units or a truck and two trailing units. (Reducible vehicle and load combinations authorized under: 23 CFR 658.13; 23 CFR 658, App. C; and A.R.S. § 28-1103)	
Route	Locations Authorized for LCV Travel
I-15	MP 0.00 (Nevada State Line) to MP 29.40 (Utah State Line)
State 98	MP 294.67 (Junction US 89) to MP 314.67
State 389	MP 0.00 (Utah State Line) to MP 32.60 (Junction US 89A)
US 89	MP 536.99 to MP 556.99 (Utah State Line)
US 89A	MP 579.30 (Junction SR 67) to MP 613.03 (Utah State Line)
US 160	MP 393.57 (Junction US 163 at Kayenta) to MP 470.00 (New Mexico State Line)
US 163	MP 393.52 (Junction US 160 at Kayenta) to MP 416.71 (Utah State Line)
Gross Weight of Vehicle and Load Combination	
80,001 lbs through 123,500 lbs	Permit Duration and Fee (A.R.S. § 28-1105)
	Single or 30-Day - \$75 Annual - \$360
123,501 lbs through 129,000 lbs*	Single or 30-Day - \$75 Annual - \$600
	Maximum Length
The overall length of the cargo-carrying units of a combination of vehicles shall not exceed 98 feet.	
Limits and Restrictions	
LCV operation is subject to federal bridge formula B limits and restricted to the right most traffic lane. Operation may be limited by the Department and restricted or prohibited during periods when traffic, weather, or other safety considerations make such operation unsafe or inadvisable. *A triple LCV shall not exceed 123,500 lbs except on I-15.	

**Historical Note**

New Table 2 made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table 2 amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-207. Suspension of Length Restrictions and Weight Limitations on State Routes and Highways; Healthy Forest**

- A. The Department, after conducting appropriate engineering and traffic review and analysis, may grant temporary relief from any existing length or weight restriction placed on a highway, or otherwise authorize reasonable access to any state or federal highway or route maintained by and under the jurisdiction of the Department by issuance of a special permit as provided under A.R.S. §§ 28-1103 and 28-1104.
- B. An applicant for a special permit, issued by the Department as prescribed under subsection (A), shall apply to the Department using the application procedure provided under R17-6-103.
- C. A special permit issued by the Department under subsection (A) subjects the permittee to all terms and conditions indicated on the special permit, including the period of time for which the special permit is valid, and may be renewed.
- D. To protect life, property, and environmental concerns the Department may issue a special permit under subsection (A) for the operation of an overweight vehicle or vehicle and load combination transporting timber or natural forest products, if the vehicle or vehicle and load combination is within the class A maximum limits prescribed under R17-6-201, and:
  1. Configured using one or two tridem axle groups appropriately spaced to meet any axle group weight limitations required by the Department after completing a bridge analysis on all affected routes;
  2. Traveling on an authorized highway or roadway, the maintenance of which is under the jurisdiction of the Department;
  3. Operating in the furtherance of an ongoing cooperative effort between the U.S. Forest Service, the Arizona Department of Forestry and Fire Management, county officials, or an Arizona city or town to mitigate the effects of wildfires, correct damages, or improve and otherwise manage forest health by moving or removing natural forest products or biomass;
  4. Working to reduce unnecessary fuel loads to safeguard the health, safety, and welfare of visitors to the National Forests and any residents of the surrounding communities by significantly reducing any future possibility of fueling a devastating forest fire; and
  5. Complying with all route-specific restrictions, requirements, conditions, and allowances provided under R17-6-412, Table 4.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Repealed by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). New Section made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-208. Repealed**

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Repealed by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-209. Class A - Watercraft Special Permit - Specific Vehicle and Overwidth Watercraft Load Combination**

- A. The Department shall issue an annual class A - Watercraft special permit according to the following criteria for multiple trips of a specific vehicle and overwidth watercraft load combina-

tion that exceeds the width threshold established under A.R.S. § 28-1093 and R17-6-102, Table 1:

Vehicle or load description	A specific vehicle combination transporting an overwidth watercraft load that is currently registered with the Arizona Game & Fish Department or the U.S. Coast Guard (as applicable), is no more than 10 feet in width, and is within all other threshold dimensions provided under R17-6-102, Table 1
Permit option	Multiple trip: one year
Fee (A.R.S. § 28-1103)	\$45

- B. An applicant for an annual class A - Watercraft special permit shall apply to the Department and submit appropriate fees using the application procedure provided under R17-6-103.
- C. In addition to the application procedure provided under R17-6-103, an applicant for an annual class A - Watercraft special permit shall submit to the Department proof of a valid watercraft registration or assigned watercraft registration number issued by the Arizona Game and Fish Department or U.S. Coast Guard.
- D. A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under R17-6-412, Table 4, unless operating in full compliance with all indicated restrictions and requirements.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-210. Page-Lake Powell Area Houseboat Transport Provisions**

- A. A permit applicant shall use the procedures under this Section to apply for an extended approval class C special permit to transport a houseboat of the dimensions specified under subsection (C) on a highway listed under Table 5.
- B. A permit applicant shall apply for a permit under this Section at the following Arizona Port of Entry location:
  - Page Port of Entry
  - U.S. Highway 89, Milepost 551
  - P.O. Box 1807
  - Page, AZ 86040
  - Telephone: (928) 645-3269
- C. An extended approval class C special permitted vehicle with at least one front and one rear escort vehicle may operate on a highway listed under Table 5 during daylight hours as provided under R17-6-401, including any weekday, weekend, or holiday, if it does not exceed dimensions as follows:
  1. 16 feet 6 inches in width;
  2. 25 feet in height;
  3. 120 feet in length;
  4. 150,000 pounds; or
  5. Axle weight limits listed in Tables 3.01 through 3.09.
- D. An extended approval class C special permitted vehicle and load that exceeds 17 feet in height shall have a front escort with a height pole.
- E. For an extended approval class C special permitted vehicle and load that exceeds 14 feet in width, a permittee or driver shall ensure an appropriate level of traffic control at the Glen Canyon Bridge on US 89 by closing access to the bridge at each end and at the visitor center driveway.

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

F. If a permit applicant seeks to transport outside the requirements of this Section, the permit applicant shall apply for a class C special permit according to the procedures provided under R17-6-211.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-210 renumbered to R17-6-502; new Section R17-6-210 renumbered from R17-6-413 and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Table 5. Page-Lake Powell Area Highways**

Route	Location (MP = Milepost)
State Route 98	MP 299.50 (Junction BIA 22, Antelope Canyon); to MP 294.67 (End of route at Junction US 89)
U.S. Highway 89	MP 546.19 (Junction SR 98); to MP 556.99 (Utah State Line)

**Historical Note**

New Table 5 codified after Section R17-6-210 renumbered from Table 5 originally codified after Section R17-6-413 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-211. Class C Oversize and Overweight Special Permits - Specific Non-reducible Vehicle, Load, or Combination Over Class A Limits**

A. The Department shall issue a single trip class C oversize, overweight, or oversize and overweight special permit for a specific non-reducible vehicle, combination of vehicles, or vehicle and load combination that exceeds 250,000 pounds, a maximum permitted weight computation for overweight axle group weight distribution as provided under R17-6-411, an oversize or overweight special permit limitation provided under this Article, or a highway-specific restriction, requirement, condition, or allowance provided under R17-6-412, Table 4, according to the following criteria:

Vehicle or load description	A non-reducible vehicle or load that exceeds the dimensions and weights of all other permit classes or when class C operation is proposed on a route further restricted under R17-6-412, Table 4	
Permit option - requires pre-approval by the Class C Unit	Single trip only	Load shall be specifically described by the applicant as provided under subsection (C) and A.R.S. § 28-1104
Standard permit fees (A.R.S. § 28-1105)	Oversize only Overweight only Oversize and overweight	\$15* \$75* \$75*

\*In addition to the standard permit fees above, the Department shall collect the following class C review and analysis fee(s) as applicable to the applicant's proposed vehicle and load configuration:

Class C review and analysis fee (A.R.S. § 28-1103)	Height or width 18 feet or less	\$15
	Height or width over 18 feet	\$25
Engineering analysis (A.R.S. § 28-1103)	Prepared by non-ADOT engineer, and reviewed by ADOT engineer	\$75 per 50 mile increment of proposed route
	Prepared by ADOT engineer	\$125 per 50 mile increment of proposed route

B. An applicant for a class C oversize or overweight special permit shall:

1. Request a class C special permit using the appropriate application procedure provided under R17-6-103 and this Section;
2. Submit to the Class C Unit a completed class C special permit application, which shall include all additional information required under R17-6-104 and R17-6-108, as applicable, with all appropriate fees;
3. Contact all applicable utility and cable companies to verify adequate overhead cable and utility line clearances along the proposed route as required under R17-6-308;
4. Obtain an encroachment permit in advance of the proposed transport as provided under 17 A.A.C. 3, Article 5, if moving, manipulating, or intruding upon any fixed or temporary highway feature located within the right-of-way on any route of the State Highway System, such as a guard rail, signage, or signal; and
5. Provide and arrange for the use of additional traffic control devices appropriate for the proposed transport if the Department requires additional traffic control measures as a condition of permit approval. All additional traffic control devices shall conform to the manual and specifications adopted by the Department pursuant to A.R.S. § 28-641.

C. A complete class C special permit application for transporting an oversize, overweight, or oversize and overweight vehicle, combination of vehicles, or vehicle and load combination shall:

1. Include all information and fees required under R17-6-103(G) and this Section;
2. Indicate the origin address and destination address of the proposed route;
3. Diagram the vehicle and specified load illustrating all of the following information:
  - a. Axle spacing;
  - b. Axle weight;
  - c. Axle width;
  - d. Tires per axle;
  - e. Tire width as designated by the manufacturer;
  - f. Maximum width to the outside of the axles, excluding any load-induced tire bulge; and
  - g. Load weight.
4. Include a route survey and contingency plan, prepared as provided under R17-6-108, if required by the Department as a condition of permit approval;
5. Include proof of gross weight in the form of a public weighmaster's certificate of weight and measure issued at a certified public scale if required by the Department after twice denying an application for incorrect weights; and
6. Include any other applicable requirement as provided under R17-6-104.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

- D. A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under R17-6-412, Table 4, unless operating in full compliance with all indicated conditions and allowances.

**Historical Note**

New Section made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section repealed; new Section R17-6-211 renumbered from R17-6-204 and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-212. Class C Overweight, or Oversize and Overweight, Special Permit - Tridem Axle Group Configurations**

- A. The Department may issue a single trip class C overweight, or oversize and overweight, special permit for a specific non-reducible vehicle, combination of vehicles, or vehicle and load combination that exceeds the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411, if the vehicle, combination of vehicles, or vehicle and load combination is equipped with at least one tridem axle group configured as provided under subsection (C) to achieve a maximum permitted weight of 60,000 pounds per tridem axle group subject to the routes and restrictions provided under Table 4.
- B. An applicant for a single trip class C overweight, or oversize and overweight, special permit for tridem axle group configurations shall apply to the Department using the application procedure provided under R17-6-103, and include the \$75 standard permit fee with the \$15 class C review and analysis fee as provided under R17-6-211.
- C. The single trip class C overweight, or oversize and overweight, special permit for tridem axle group configurations is available only for a vehicle, combination of vehicles, or vehicle and load combination equipped with at least one tridem axle group configured in conformance with the following criteria:
1. A minimum of four tires per axle, or two 14-inch wide tires per axle in each tridem axle group;
  2. A minimum distance of eight feet out-to-out axle width for each tridem axle group;
  3. A minimum distance of nine feet, and a maximum distance of 14 feet, between the center of the first axle and the center of the third axle of each tridem axle group, except as provided under subsection (D);
  4. A minimum distance of 13 feet 7 inches between the center of the front steering axle and the center of the first axle of any consecutive tridem or tandem axle group; and
  5. A minimum distance of 14 feet 1 inch between any two consecutive tridem or tandem axle groups, measured from the center of the last axle of the front group to the center of the first axle of the next group, with no other axles between.
- D. A tridem axle group may be used in combination with other non-tridem axle groups if the non-tridem axle groups do not exceed the maximum permitted weight computations for over-

weight axle group weight distribution provided under R17-6-411.

**Historical Note**

New Section made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Table 6. Repealed****Historical Note**

Table 6 made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 6 repealed by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Table 7. Repealed****Historical Note**

Table 7 made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 7 repealed by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**ARTICLE 3. SAFETY REQUIREMENTS**

*Article 3, consisting of Sections R17-6-301 through R17-6-308, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).*

**R17-6-301. General Safety Requirements**

In addition to the provisions of this Article, a permittee and a driver of an oversize or overweight vehicle permitted under this Chapter, or a person or entity exempt under R17-6-102(D), shall comply with all federal motor carrier safety regulations incorporated by the Department under 17 A.A.C. Chapter 5, Article 2, as applicable to a motor carrier operating in Arizona.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**R17-6-302. Warning Flag Requirements**

- A. Specifications. Each warning flag attached to an overwidth or overlength vehicle or load shall be cloth or plastic at least 18 inches square and red or fluorescent orange in color.
- B. Display. A permittee or driver of an overwidth or overlength envelope or special permitted vehicle shall display warning flags applicable to the permittee's vehicle or vehicle and load configuration as indicated under Illustration 1.

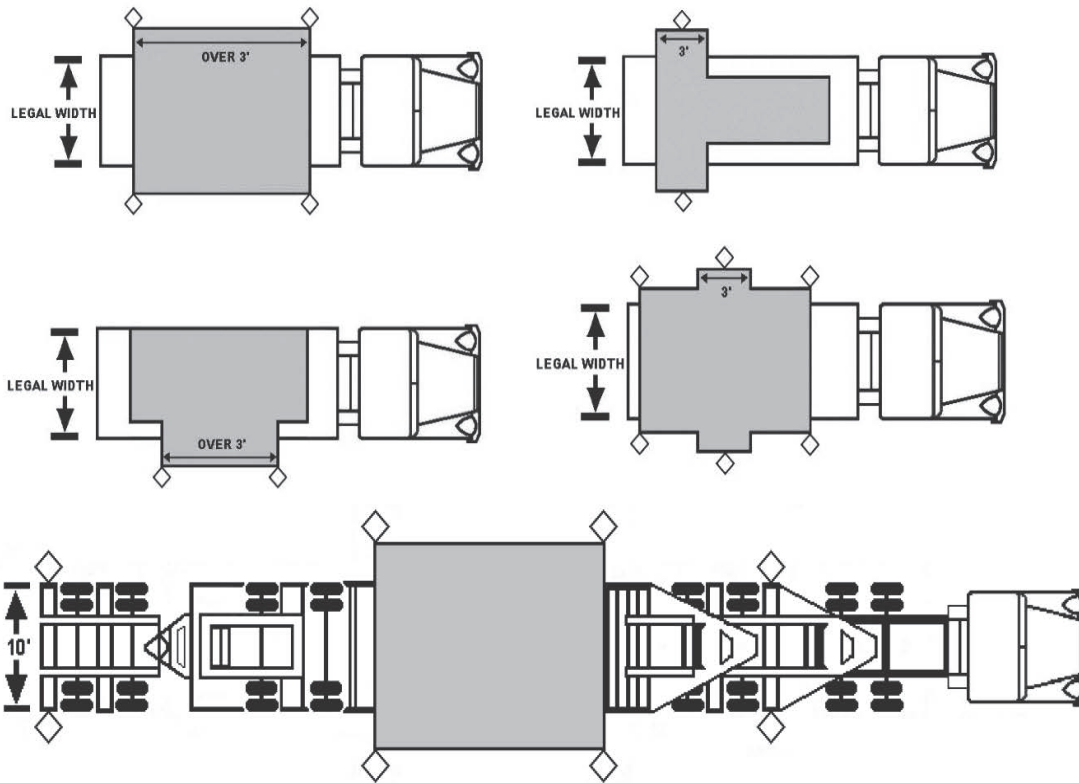
**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

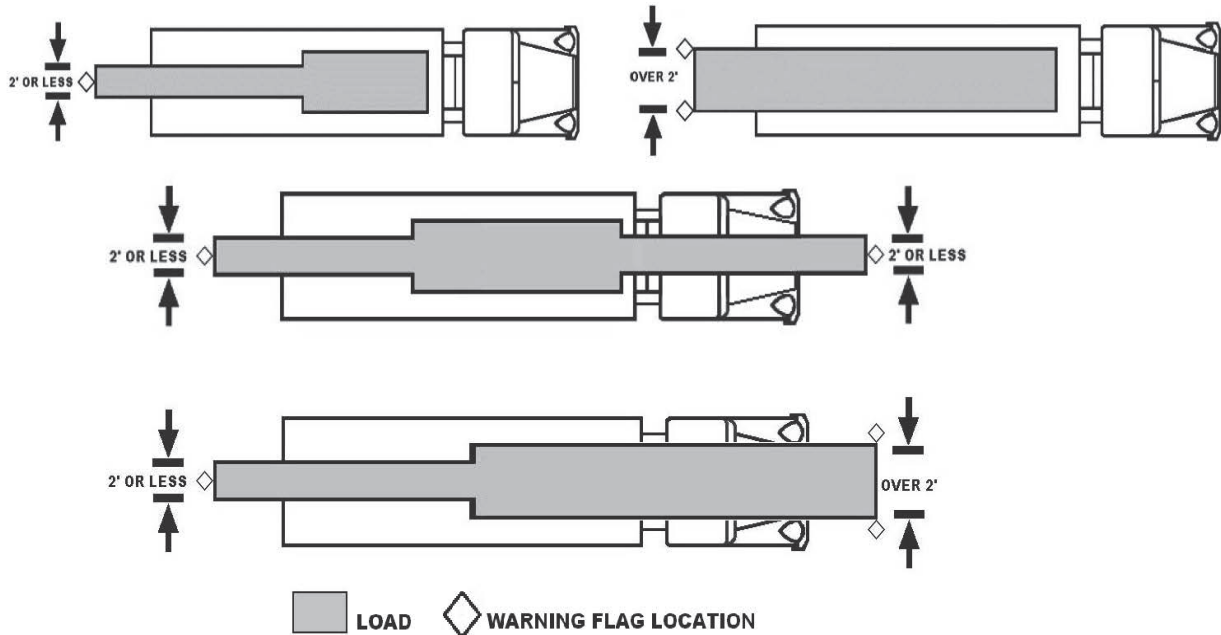
CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Illustration 1. Warning Flag Configurations

EXAMPLES FOR WARNING FLAGS ON OVERWIDTH LOADS EXTENDING MORE THAN 4 INCHES BEYOND THE OVERALL WIDTH OF THE VEHICLE



EXAMPLES FOR WARNING FLAGS ON OVERLENGTH VEHICLES OR LOADS WITH OVERHANG EXTENDING MORE THAN FOUR FEET BEYOND THE FRONT OR REAR OF THE VEHICLE



Historical Note

New Illustration made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Illustration amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Illustration amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-303. Sign Requirements**

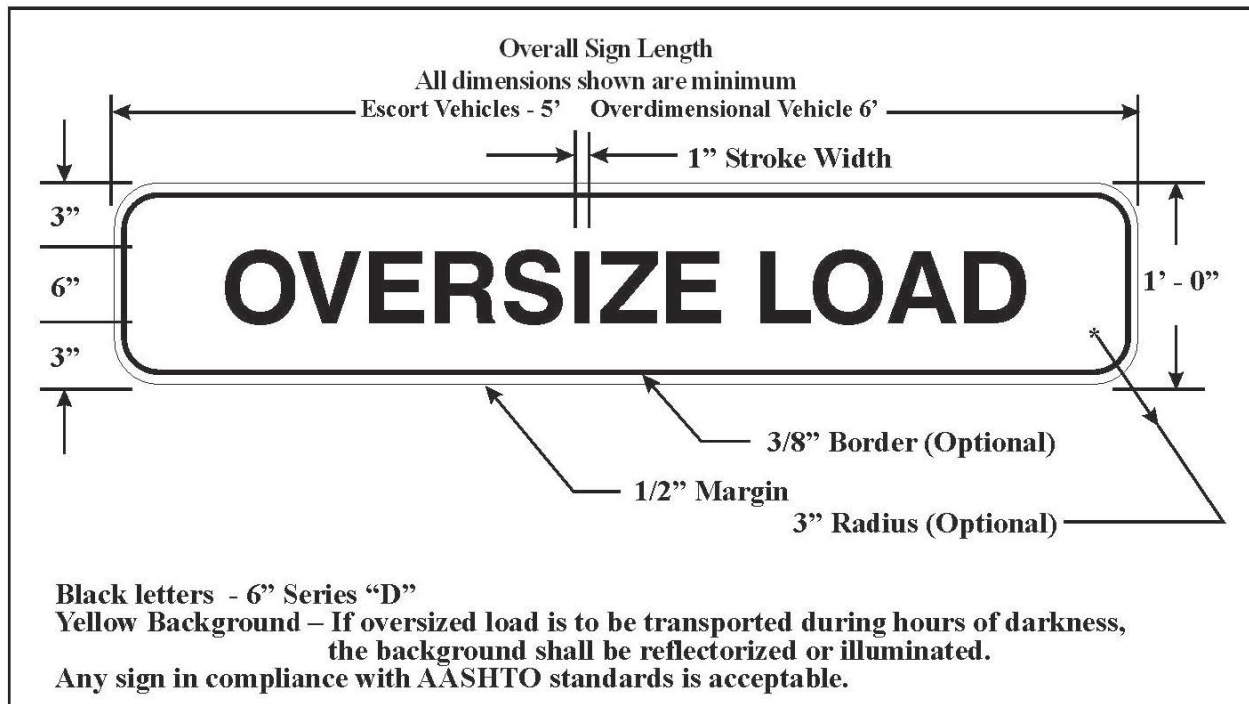
- A. A permittee or driver shall ensure that an oversize or overweight vehicle or load displays an "OVERSIZE LOAD" sign if the vehicle or load is nine feet or more in width.
- B. A permittee or driver may display an "OVERSIZE LOAD" sign on any oversize or overweight envelope or special permitted vehicle or load not specified under subsection (A) if necessary to ensure maximum visibility for public safety.
- C. An "OVERSIZE LOAD" sign shall meet construction specifications provided under Illustration 2 at a minimum.
- D. A permittee or driver shall display required "OVERSIZE LOAD" signs that are:
  - 1. Mounted to the front or roof of the power unit,
  - 2. Mounted to the rear of the load or loaded vehicle,
  - 3. Parallel with the road surface from side-to-side,
  - 4. Readable from left to right, and

- 5. Clearly visible from the front and rear of the loaded vehicle.
- E. If a permittee or driver required under this Section to display an "OVERSIZE LOAD" sign is not transporting an oversize or overweight load, the permittee or driver shall ensure that each sign is not visible to traffic.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Illustration 2. "OVERSIZE LOAD" Sign**



**Historical Note**

New Illustration made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Illustration amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**R17-6-304. Safety Lighting Device Requirements**

- A. A permittee or driver of an oversize or overweight vehicle or load shall:
  - 1. Comply with all applicable lighting equipment requirements under A.R.S. Title 28, Chapter 3, Article 16, and 49 CFR 393 as incorporated by reference under A.A.C. R17-5-202; and
  - 2. Operate with the lighting equipment illuminated at the times specified under A.R.S. § 28-922.
- B. A permittee or driver of a vehicle transporting a load that projects more than four inches beyond the overall width of the vehicle shall attach safety lighting during nighttime operation according to the requirements provided under Illustration 4, and R17-6-307, that most closely correspond to the permittee's or driver's vehicle and load configuration.

- C. A permittee or driver of an oversize vehicle or load that projects more than four feet in front or rear overhang, shall attach safety lighting during nighttime operation according to the requirements provided under Illustration 4, and R17-6-307, that most closely correspond to the permittee's or driver's vehicle and load configuration.

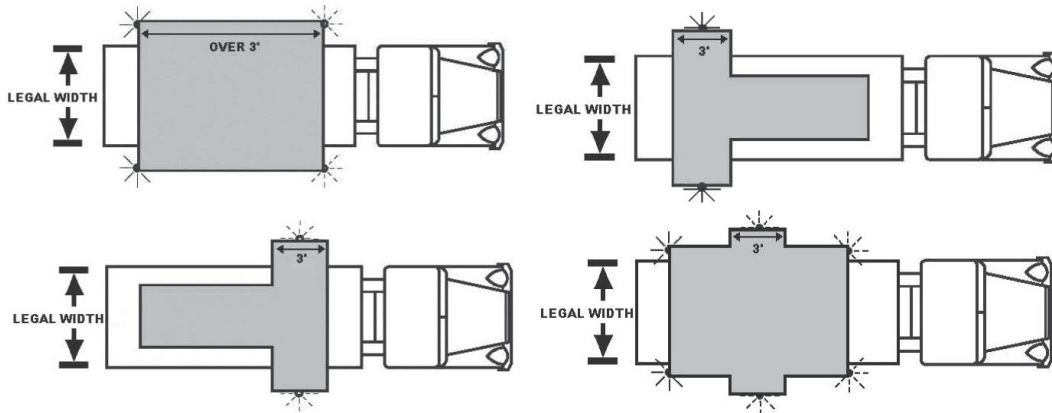
**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

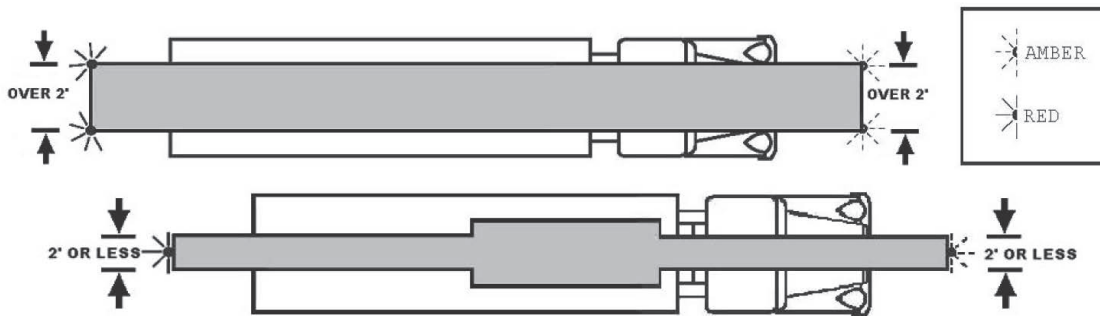
CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Illustration 4. Safety Lighting Configurations

EXAMPLES FOR WARNING LIGHTS ON OVERWIDTH LOADS WITH OVERHANG EXTENDING MORE THAN FOUR INCHES BEYOND THE OVERALL WIDTH OF THE VEHICLE



EXAMPLES FOR WARNING LIGHTS ON OVERLENGTH VEHICLES OR LOADS WITH OVERHANG EXTENDING MORE THAN FOUR FEET BEYOND THE FRONT OR REAR OF THE VEHICLE



Historical Note

New Illustration made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

R17-6-305. Escort Vehicles

A. Service requirement.

1. A permittee transporting an oversize or overweight vehicle or load shall use all escort vehicles required by the Department as a condition of envelope or special permit issuance under this Chapter.
2. The Department shall determine whether one or more escort vehicles must accompany an oversize or overweight envelope or special permitted vehicle by considering the following in relation to the proposed transport and route:
  - a. Roadway dynamics, including surface condition, grade, width, and height limitations;
  - b. Overall dimensions of the vehicle and load;
  - c. Need for frequent stops;
  - d. Concern for public safety; and
  - e. Time of transport.
3. According to the criteria applicable under subsection (A)(2), the Department shall require two or more oversize or overweight envelope or special permitted vehicles traveling together to be accompanied by at least one escort vehicle per load.

B. Vehicle, operator, and equipment requirements.

1. A vehicle qualifies as an escort vehicle if it:

- a. Is a passenger car or two-axle truck operating as a single unit,
- b. Is currently registered, and
- c. Meets insurance requirements as provided by law.
2. An escort vehicle operator, except for a law enforcement escort, while in service under this Chapter shall:
  - a. Meet all requirements under A.R.S. § 28-1110, and maintain certification through a program that meets the escort vehicle operator training and certification standards of the Commercial Vehicle Safety Alliance or an equivalent program, whether in this state or another state, that meets the same objectives;
  - b. Carry in the escort vehicle the same emergency equipment required for a truck, truck tractor, or bus under A.R.S. § 28-960 and 49 CFR 393.95, which shall include:
    - i. Fire extinguishers;
    - ii. Warning devices for stopped vehicles; and
    - iii. Emergency staff-mounted warning flags;
  - c. Display an "OVERSIZE LOAD" sign:
    - i. Constructed for escort vehicles as provided under R17-6-303, Illustration 2;
    - ii. Mounted above the vehicle's roofline and visible to approaching traffic from the front and rear;



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

- iii. Accompanied by two flags, one mounted on each side of the oversize load sign; and
- iv. Concealed when not in use; and
- d. Ensure continuous communication by two-way radio:
  - i. Capable of transmitting and receiving a minimum of 1/2 mile; and
  - ii. Compatible with the two-way radios used by the driver of the escorted vehicle, law enforcement escorts, and all other accompanying escort vehicles.
- C. Operation.
  - 1. Lighting requirement. While in service, an escort vehicle operator shall maintain continuous illumination of headlights and overhead warning lights as prescribed under A.R.S. § 28-947.
  - 2. Lead and follow distance. An escort vehicle operator shall maintain a lead or follow distance from an escorted vehicle that generally does not exceed 1,500 feet on an open state highway or 250 feet in an urban setting. When determining the appropriate lead or follow distance, an escort vehicle operator shall:
    - a. Consider traffic density, road conditions, road type, speed, and type of load;
    - b. Ensure constant radio communication with all escorts and the escorted vehicle; and
    - c. Maintain visual contact with the escorted vehicle at all times.
  - 3. Stop provisions at an intersection with a traffic control signal.
    - a. When an oversize or overweight envelope or special permitted vehicle is required to stop, the lead-escort vehicle operator shall proceed through the intersection and stop safely off the roadway. The lead-escort vehicle operator shall resume an appropriate lead distance as soon as is safely possible.
    - b. When a following-escort vehicle is required to stop, the driver of the oversize or overweight envelope or special permitted vehicle shall proceed without stopping. The following-escort vehicle operator shall resume an appropriate following distance behind the oversize or overweight envelope or special permitted vehicle as soon as is safely possible when clear of the intersection.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 13 A.A.R. 866, effective March 6, 2007 (Supp. 07-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-306. Traffic Control Provisions**

- A. The Department may require additional traffic control by a uniformed certified law enforcement officer to ensure highway safety. The Department shall consider the criteria under R17-6-305(A) when determining the need for additional traffic control.
- B. If the Department requires a law enforcement escort under R17-6-412, Table 4, or as necessary to promote public safety, the permittee or driver of the oversize or overweight envelope or special permitted vehicle shall:
  - 1. Contact the Arizona Department of Public Safety at least 12 hours before transport to request the appropriate num-

- ber of uniformed certified law enforcement escorts required for the permitted activity; and
- 2. Ensure continuous two-way radio communication during transport with all law enforcement and other escort vehicles required to accompany the permitted vehicle under R17-6-305 and R17-6-307.
- C. If the Arizona Department of Public Safety is unable to provide the appropriate law enforcement escorts requested as provided under subsection (B), the permittee or driver of an oversize or overweight envelope or special permitted vehicle may use any uniformed certified law enforcement escorts if at least one officer is certified for enforcement of the Federal Motor Carrier Safety Regulations of the U.S. Department of Transportation's Federal Motor Carrier Safety Administration.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-307. Projecting Vehicle or Load**

- A. The Department shall issue a class A special permit, as required under Section R17-6-201, for transporting a vehicle or load that projects from either side of the vehicle:
  - 1. Two feet or less, if the projecting portion of the vehicle or load has a thickness of less than 12 inches; or
  - 2. Three feet or less, if the projecting portion of the vehicle or load has a thickness of 12 inches or more.
- B. The Department shall issue a class C special permit, as required under Section R17-6-211, for transporting a vehicle or load that projects from either side of the vehicle:
  - 1. More than two feet, if the projecting portion of the vehicle or load has a thickness of less than 12 inches; or
  - 2. More than three feet, if the projecting portion of the vehicle or load has a thickness of 12 inches or more.
- C. Unless the Department requires additional escort vehicles under R17-6-306 or R17-6-412, Table 4, a permittee or driver of a vehicle or load projecting excess overhang shall have escort vehicle accompaniment as follows:
  - 1. Over 20 feet in length of front overhang requires a front escort;
  - 2. Over 20 feet in length of rear overhang requires a rear escort; and
  - 3. Over 20 feet in length of overhang at both the front and rear of a vehicle requires a front and rear escort.
- D. A permittee or driver of a projecting vehicle or load with more than a four-foot front or rear overhang shall:
  - 1. Attach warning flags to the vehicle or load as provided under R17-6-302 and Illustration 1, for daylight operation; or
  - 2. Attach safety lighting to the load as provided under R17-6-304 and Illustration 4, for nighttime operation.
- E. An integral component or components removed from a loaded primary object may be transported on the same vehicle bearing the primary object provided the component or components do not cause the hauling vehicle to exceed a size or weight permitted for the primary object.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-308. Permittee or Driver Obligation to Notify Utility Companies of Overheight Transport**

A permittee or driver shall notify a responsible utility company of possible disturbance or damage, as provided under A.R.S. § 40-360.43, if overhead utility lines extend across a proposed route and the permitted vehicle or load exceeds 16 feet in height or any route-specific height restriction provided under R17-6-412, Table 4.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**ARTICLE 4. TRANSPORT PROVISIONS**

*Article 4, consisting of Sections R17-6-401 through R17-6-412, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).*

**R17-6-401. General Highway Operations**

- A.** Except as provided under R17-6-205(B), and subject to R17-6-412, Table 4, a permittee or driver of an oversize, overweight, or oversize and overweight envelope or special permitted vehicle is eligible for continuous travel, if the envelope or special permitted vehicle does not exceed any of the following dimensions:
1. 10 feet in width;
  2. 14 feet 6 inches in height;
  3. 10 feet in length of front overhang;
  4. 10 feet in length of rear overhang;
  5. 120 feet in overall length; or
  6. 250,000 pounds.
- B.** A permittee or driver of an oversize or overweight envelope or special permitted vehicle exceeding a dimension prescribed under subsection (A) or R17-6-205(B) shall:
1. Operate no earlier than one-half hour before sunrise and no later than one-half hour after sunset, exact daily times as defined under R17-6-101, except as otherwise provided under this Article, or unless the Department otherwise:
    - a. Restricts operation on a highway;
    - b. Grants permit-specific hours of operation other than those listed under this subsection as a necessary condition of permit issuance to maintain highway safety; or
    - c. Grants route-specific allowances under R17-6-412, Table 4, for night and weekend transport under R17-6-402.
  2. Operate in the rightmost lane of a multi-lane highway if indicated on the envelope or special permit, except to overtake and pass another vehicle; and
  3. Maintain a minimum distance of 2,000 feet from any other oversize or overweight envelope or special permitted vehicle traveling on the same highway in the same direction except when passing.
- C.** A driver of an oversize or overweight vehicle or load shall not exceed the lower maximum speed determined by either of the following:
1. A speed limit printed on an issued permit, or
  2. A highway-posted vehicle-specific speed limit.
- D.** The Department may order an alternative speed restriction to prevent:
1. Hazardous traffic conditions, or
  2. Damages to a highway or highway feature.
- E.** Removal of highway signs, guardrails, or other assets from a highway right-of-way is illegal under A.R.S. § 28-7053, and not authorized by an oversize or overweight envelope or spe-

cial permit issued by the Department under this Chapter. A separate encroachment permit issued by the Department under 17 A.A.C. 3, Article 5, is required before entering any highway right-of-way for any purpose other than authorized public travel. The activities authorized while in the right-of-way shall be specifically outlined in the encroachment permit and completed under Department supervision. A permittee or driver shall follow all additional requirements and instructions as indicated on the encroachment permit if the Department has authorized such activity to be conducted within a highway right-of-way.

- F.** Replacement of any state-owned highway feature moved under an encroachment permit, issued pursuant to 17 A.A.C. 3, Article 5, as a result of the transport of an oversize or overweight vehicle along a traveled route, shall be detailed on the encroachment permit and completed under Department supervision.
- G.** A permittee or driver of an oversize or overweight envelope or special permitted vehicle shall, prior to commencing transport on any trip, access and review the most current information on highway-specific conditions, closures, restrictions, and other requirements applicable to R17-6-412, Table 4, as provided in real-time on the Department's electronic permitting website.
- H.** A permittee or driver of an oversize or overweight envelope or special permitted vehicle may additionally receive real-time alerts and critical information on highway-specific conditions, closures, restrictions, and other requirements temporarily or permanently affecting travel on a route listed under R17-6-412, Table 4, by accessing the Department's:
1. Twitter feed, @ArizonaDOT;
  2. ADOTAlerts mobile app, available free at ADOTAlerts.com, which can provide critical information directly to all app users in an affected area where and when a freeway closure or other major traffic event occurs, and where possible, may provide advance warning of an alternate route designation;
  3. Arizona Traveler Information System at AZ511.gov; or
  4. Automated phone service by dialing 511.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-402. Night and Weekend Transport**

- A.** Except as provided under R17-6-210, R17-6-409, and subject to R17-6-412, Table 4, a permittee or driver of an oversize, overweight, or oversize and overweight envelope or special permitted vehicle that is ineligible for continuous travel under R17-6-205 or R17-6-401 due to excess width or height, may transport at night or on a weekend as provided under this Section, if the envelope or special permitted vehicle is:
1. Over 10 to 16 feet in width;
  2. Over 14 feet 6 inches to 16 feet in height;
  3. 120 feet or less in overall length; or
  4. 250,000 pounds or less in overall weight.
- B.** Subject to all other time of movement restrictions provided under this Article, and unless further restricted under this Chapter, a permittee or driver of an envelope or special permitted vehicle described under subsection (A) may transport at night or on a Saturday or Sunday as follows:
1. On any non-holiday night or weekend;

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

2. Beginning at 3:00 a.m. until no later than one-half hour after sunset, exact daily times as defined under R17-6-101;
  3. Using select routes authorized by the Department under R17-6-412, Table 4, for night and weekend transport, unless the Department:
    - a. Restricts operation on a highway; or
    - b. Grants alternate, permit-specific, hours of operation other than those listed under this subsection as a necessary condition for maintaining highway safety;
  4. Operating in the rightmost lane of a multi-lane highway if indicated on the envelope or special permit, except to overtake and pass another vehicle; and
  5. Maintaining a minimum distance of 2,000 feet from any other oversize or overweight vehicle, combination of vehicles, or vehicle and load combination traveling on the same highway in the same direction except when passing.
- C.** A permittee or driver of a vehicle or load transporting under this Section shall additionally ensure appropriate escort vehicle accompaniment and comply with all other applicable restrictions provided under Articles 3 and 4 of this Chapter.
- D.** Unless the Department requires additional escort vehicles under R17-6-306, R17-6-307, or R17-6-412, Table 4, a permittee or driver of an envelope or special permitted vehicle transporting under this Section shall ensure appropriate escort vehicle accompaniment from 3:00 a.m. until one-half hour before sunrise as follows:
1. Over 11 to 14 feet in width requires a rear escort;
  2. Over 14 to 16 feet in width requires a front and rear escort; and
  3. Over 15 feet in height requires a front escort with a height pole.
- E.** The Department may approve night and weekend transport under a class C special permit for a vehicle, combination of vehicles, or a vehicle and load combination exceeding a dimension provided under this Section, or R17-6-205, upon determining the exception to be in the best interest of public safety.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-402 repealed; new Section R17-6-402 renumbered from R17-6-408 and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-403. Holiday Transport Restriction**

- A.** Except as provided under subsection (D), R17-6-210, R17-6-409, or while operating under the emergency operation provisions in R17-6-112, a permittee or driver of an oversize, overweight, or oversize and overweight envelope or special permitted vehicle is subject to the holiday transport restrictions provided under this Section if the vehicle or load exceeds any of the following dimensions:
1. 10 feet in width, (11 feet in width for specialty equipment under R17-6-205(B));
  2. 14 feet 6 inches in height;
  3. 10 feet in length of front overhang;
  4. 10 feet in length of rear overhang;
  5. 120 feet in overall length; or
  6. 250,000 pounds.
- B.** A permittee or driver of an oversize, overweight, or oversize and overweight envelope or special permitted vehicle described under subsection (A) shall not transport on the following holidays:

1. New Year's Day,
2. Memorial Day,
3. Independence Day,
4. Labor Day,
5. Thanksgiving Day, or
6. Christmas Day.

- C.** The transport restriction for a holiday listed under subsection (B) shall also include days before and after the holiday as follows:
1. When a holiday occurs on a Friday, transport shall stop at 12 noon on the preceding Thursday and may resume the following Monday at one-half hour before sunrise, or Monday at 3:00 a.m. if eligible for night transport under R17-6-402;
  2. When a holiday occurs on a Saturday, transport shall stop at 12 noon on the preceding Thursday and may resume the following Monday at one-half hour before sunrise, or Monday at 3:00 a.m. if eligible for night transport under R17-6-402;
  3. When a holiday occurs on a Sunday, transport shall stop at 12 noon on the preceding Friday and may resume the following Tuesday at one-half hour before sunrise, or Tuesday at 3:00 a.m. if eligible for night transport under R17-6-402;
  4. When a holiday occurs on a Monday, transport shall stop at 12 noon on the preceding Friday and may resume the following Tuesday at one-half hour before sunrise, or Tuesday at 3:00 a.m. if eligible for night transport under R17-6-402; and
  5. When a holiday occurs on a Tuesday, Wednesday, or Thursday, transport shall stop at 12 noon on the day before the holiday and may resume the day after the holiday at one-half hour before sunrise, or the day after the holiday at 3:00 a.m. if eligible for night transport under R17-6-402.
- D.** The Department may approve holiday transport under a class C special permit for a vehicle, combination of vehicles, or a vehicle and load combination exceeding a dimension provided under subsection (A), upon determining the exception to be in the best interest of public safety.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). R17-6-403 renumbered to R17-6-405; new Section R17-6-403 renumbered from R17-6-406 and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-404. Metropolitan Curfew Transport**

- A.** Except as provided under subsection (B), and unless otherwise provided under this Article, an envelope or special permitted vehicle that exceeds 10 feet in width is subject to the metropolitan curfew provided under subsections (C) and (D) and shall not exceed any of the following dimensions during curfew hours:
1. 16 feet in height, or less if further restricted under R17-6-412, Table 4;
  2. 10 feet in length of front overhang;
  3. 10 feet in length of rear overhang;
  4. 120 feet in overall length; or
  5. 250,000 pounds.
- B.** Unless otherwise provided under this Article, a self-propelled mobile crane, drilling rig, or similar specialty equipment exceeding eleven feet in width is subject to the metropolitan

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

curfew provided under subsections (C) and (D) and shall not exceed any of the following dimensions during curfew hours:

1. 14 feet 6 inches in height;
2. 10 feet in length of front overhang;
3. 10 feet in length of rear overhang;
4. 120 feet in overall length; or

5. 250,000 pounds.

- C. A permittee or driver of an envelope or special permitted vehicle or load described under subsection (A) or (B) is subject to width restrictions on metropolitan routes if transporting during curfew hours, as provided below:

Metropolitan Phoenix - Curfew Routes and Restrictions		
Route	Restriction Location (MP = Milepost)	Width Restrictions Monday through Friday During Curfew Hours: 7:00 a.m. to 9:00 a.m.; and 4:00 p.m. to 6:00 p.m.
SR 24	MP 0.00 (Junction SR 202 Loop) to MP 1.00 (Ellsworth Road)	Over 10' - 12' = Requires rear escort Over 12' - 16' = No transport
SR 202 Loop	MP 9.80 (Junction SR 101 Loop) to MP 57.24 (Junction I-10)	Over 10' - 12' = Requires rear escort Over 12' - 16' = No transport
SR 202 Loop	MP 55.50 (Junction I-10, Santan TI) to MP 77.80 (Junction I-10, West Phoenix TI)	Over 10' - 12' = Requires rear escort Over 12' - 16' = No transport
SR 101 Loop	MP 1.21 (Junction I-10, near 99th Avenue) to MP 61.33 (Junction SR 202 Loop)	Over 10' - 12' = Requires rear escort Over 12' - 16' = No transport
Metropolitan Tucson - Curfew Routes and Restrictions		
SR 989	MP 34.01 (N. Rancho Vistoso Blvd/N. 1st Avenue) to MP 36.00 (Junction SR 77 at Oracle Road)	Over 10' - 12' = Requires rear escort Over 12' - 16' = No transport

- D. A permittee or driver of an envelope or special permitted vehicle or load described under subsection (A) or (B) shall not transport on the following metropolitan routes if transporting

Monday through Friday during curfew hours, as provided below:

Metropolitan Phoenix - Curfew Routes and Restrictions		
Route	Restriction Location (MP = Milepost)	Width Restrictions Monday through Friday During Curfew Hours: 7:00 a.m. to 9:00 a.m.; and 4:00 p.m. to 6:00 p.m.
I-10	MP 133.98 (Junction SR 101 Loop) to MP 161.35 (Junction SR 202 Loop, Santan)	Over 10' - 16' = No transport
I-17	MP 193.94 (Junction I-10 and SR 51) to MP 214.96 (Junction SR 101 Loop)	Over 10' - 16' = No transport
SR 51	MP 0.00 (Junction I-10 and SR 202 Loop) to MP 15.90 (Junction SR 101 Loop)	Over 10' - 16' = No transport
SR 143	MP 0.00 (Junction I-10) to MP 3.81 (McDowell Road)	Over 10' - 16' = No transport
SR 202 Loop	MP 0.00 (Junction I-10 and SR 51) to MP 9.80 (Junction SR 101 Loop)	Over 10' - 16' = No transport
SR 202 Spur	MP 5.15 (Junction SR 202 Loop) to MP 6.28 (Sky Harbor Blvd)	Over 10' - 16' = No transport
US 60	MP 148.90 (Junction SR 101 Loop) to MP 190.51 (Junction SR 202 Loop)	Over 10' - 16' = No transport
Metropolitan Tucson - Curfew Routes and Restrictions		
I-10	MP 236.42 (Marana Road TI) to MP 270.57 (Kolb Road TI)	Over 10' - 16' = No transport
I-19	MP 58.80 (Valencia Road TI, Kilometer Post 94.62) to MP 63.43 (Junction I-10, Kilometer Post 102.08)	Over 10' - 16' = No transport
SR 77	MP 68.05 (Junction I-10 at W. Miracle Mile) to MP 81.82 (Junction SR 989 at E. Tangerine Road)	Over 10' - 16' = No transport
SR 86	MP 164.04 (Camino Verde Road) to MP 171.44 (Junction I-19)	Over 10' - 16' = No transport
SR 210	MP 1.00 (Broadway Blvd) to MP 4.78 (Richey Blvd)	Over 10' - 16' = No transport

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-405. Weather Restrictions; Hazardous Conditions**

- A. Responsibility. A driver of an oversize or overweight vehicle, or vehicle and load combination, shall:
1. Use the criteria provided under subsection (B) to identify unsafe roadway conditions and discontinue transport until safe to continue, and
  2. Comply with all official agency weather-related travel advisories prohibiting oversize or overweight transport.

- B. Determining conditions. A driver of an oversize or overweight vehicle, or vehicle and load combination, shall not transport under the following hazardous conditions:

Hazardous Conditions:	Possible Causes May Include:
Driver visibility range becomes less than 500 feet	<ul style="list-style-type: none"> <li>• Blowing dust</li> <li>• Falling snow</li> <li>• Fog</li> <li>• Heavy rain</li> </ul>

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Road surface condition reduces normal traction	<ul style="list-style-type: none"> <li>• Snow</li> <li>• Ice</li> <li>• Flooding</li> </ul>
A load destabilizing condition endangers road surface or traffic	<ul style="list-style-type: none"> <li>• High winds</li> <li>• Falling objects</li> </ul>

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-405 repealed; new Section R17-6-405 renumbered from R17-6-403 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-406. Renumbered**

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-406 renumbered to R17-6-403 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-407. Route-specific and Permit-specific Transport Restrictions**

A permittee or driver of a class C oversize or overweight special permitted vehicle or load shall not transport from 12 noon on Friday until 3:00 a.m. on Monday if transporting on a route identified by the Department under R17-6-412, Table 4, as being subject to this Section.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Section R17-6-407 renumbered to R17-6-414; new Section made by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-408. Renumbered**

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-408 renumbered to R17-6-402 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-409. Lake-specific Weekend and Holiday Transport Exception**

A permittee or driver that transports a personal watercraft load of no more than 12 feet in width under a class A special permit may operate from one-half hour before sunrise to one-half hour after sunset on a weekend or holiday on a state highway within 10 miles of an area constructed and maintained for the purpose of launching and retrieving watercraft for the following Arizona lakes:

1. Alamo,
2. Havasu,
3. Mead,
4. Mohave,
5. Powell, and
6. Saguaro.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-409 repealed; new Section R17-6-409 renumbered from R17-6-414 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-410. Special Mobile Home Towing Restriction**

A. A vehicle towing a mobile home shall have a factory rating that corresponds with the following criteria:

Load measurement criteria	Towing vehicle factory rating
10 feet or less in width and 50 feet or less in length, including hitch	1 1/2 tons
More than 10 feet in width or more than 50 feet in length, or both	Two tons; four tires per drive axle and minimum 99 inch wheel base

B. A mobile home transporter shall cover the open side of a mobile home module with plastic sheeting no thinner than 1.5 mil plus a rigid grillwork backing.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3).

**R17-6-411. Maximum Permitted Weights**

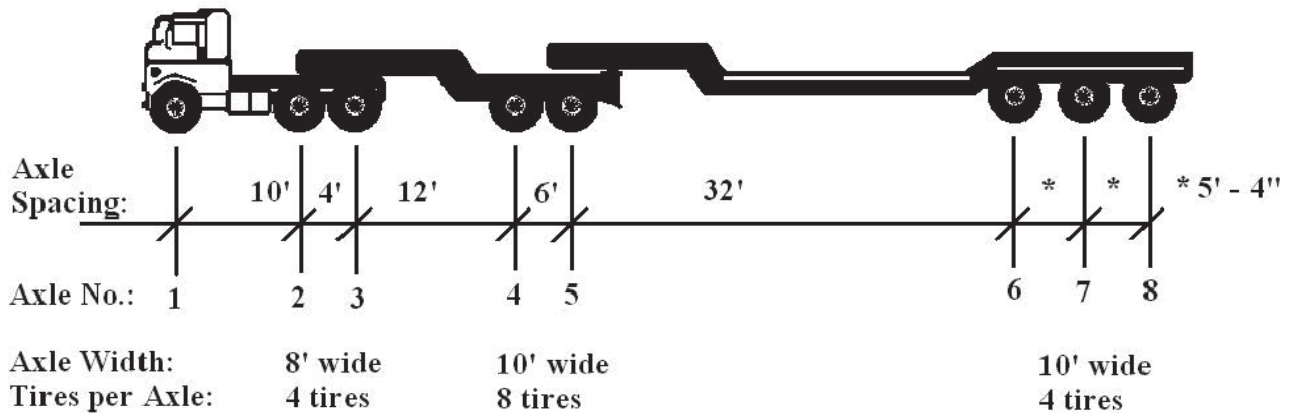
- A. Except as provided under R17-6-212, an applicant requesting an envelope or special permit under this Chapter for transporting a non-reducible overweight or oversize and overweight vehicle, combination of vehicles, or vehicle and load combination shall use the formulas and computations provided under Illustration 3 and Tables 3.01 through 3.09 to determine the maximum weights allowed on any combination of axles spaced within a maximum distance of 18 feet between the front and rear axle of each axle group.
- B. The formulas and computations provided under Illustration 3, and Tables 3.01 through 3.09, are an expansion of the federal bridge formula provided under A.R.S. § 28-1100 for use by the Department when issuing an overweight or oversize and overweight envelope or special permit for movement of a non-reducible vehicle or load under this Chapter.
- C. The axle group weights provided under Illustration 3, and Tables 3.01 through 3.09, represent the maximum weights allowed on any combination of axles spaced within a distance of up to 18 feet between the front and rear axle of any given group. The values in Table 3.01 line "A" are an expression of the formula  $W = 1.5 \times 700 (L + 40)$  for  $L = 3' 5"$  to  $18' 0"$ , where L is the distance between the centers of the front and rear axles of an axle group. The values in line "B" and in the remaining Tables are calculated by applying the percentages provided in the Table footnotes to increase the allowable weights based on wider axle width and an increased number of tires. Measured axle widths are rounded down to the nearest 3" increment when determining the appropriate Table to use.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Illustration 3. Overweight Axle Group Weight Calculation



- (Axle 1); limited to 28,000 lbs for single alone
- (Axle 2 + 3); L = 4'; W = 46,200 lbs for tandem alone
- (Axle 1) + (Axle 2 + 3); L = 14'; W = 56,700 lbs for the group
- (Axle 4 + 5); L = 6'; W = 60,375 lbs (25% increase for 10' wide - 8 tires)
- (Axle 2 + 3 + 4); L = 16'; W = (2/3 x 58,800) + (1/3 x 73,500) = 63,700 lbs
- (Axle 3 + 4 + 5); L = 18'; W = (1/3 x 60,900) + (2/3 x 76,125) = 71,050 lbs
- (Axle 3 + 4); L = 12'; W = (1/2 x 54,600) + (1/2 x 68,250) = 61,425 lbs
- (Axle 6 + 7 + 8); L = 10' 8"; W = 61,180 (15% increase for 10' wide - 4 tires)

Tables 3.01 through 3.09 provide the maximum allowable axle group weights determined by using the computation formula: Weight = 1.5 X 700 (L + 40) for L = 3' 5" to 18' 0", where L = Distance between the center of the front axle and the center of the rear axle of any group of axles located within a space of 3' 5" to 18' 0".

Axle group configurations of different widths or numbers of tires are prorated within the total group load when determining any allowable increase over the basic formula weight as indicated by the footnotes in Tables 3.01 through 3.09.

**Historical Note**

New Illustration 3 codified after Section R17-6-411 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.01. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 0 Inches

Maximum allowable axle group weights determined by using the computation formula:  $Weight = 1.5 \times 700 (L + 40)$ , where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3'	28,000	28,000	28,000	28,000	28,000	45,588	45,675	45,763	45,850	45,938	46,025	46,113
B	↓	32,200	32,200	32,200	32,200	32,200	52,426	52,526	52,627	52,728	52,828	52,929	53,029
A	4'	46,200	46,288	46,375	46,463	46,550	46,638	46,725	46,813	46,900	46,988	47,075	47,163
B		53,130	53,231	53,331	53,432	53,533	53,633	53,734	53,834	53,935	54,036	54,136	54,237
A	5'	47,250	47,338	47,425	47,513	47,600	47,688	47,775	47,863	47,950	48,038	48,125	48,213
B		54,338	54,438	54,539	54,639	54,740	54,841	54,941	55,042	55,143	55,243	55,344	55,444
A	6'	48,300	48,388	48,475	48,563	48,650	48,738	48,825	48,913	49,000	49,088	49,175	49,263
B		55,545	55,646	55,746	55,847	55,948	56,048	56,149	56,249	56,350	56,451	56,551	56,652
A	7'	49,350	49,438	49,525	49,613	49,700	49,788	49,875	49,963	50,050	50,138	50,225	50,313
B		56,753	56,853	56,954	57,054	57,155	57,256	57,356	57,457	57,558	57,658	57,759	57,859
A	8'	50,400	50,488	50,575	50,663	50,750	50,838	50,925	51,013	51,100	51,188	51,275	51,363
B		57,960	58,061	58,161	58,262	58,363	58,463	58,564	58,664	58,765	58,866	58,966	59,067
A	9'	51,450	51,538	51,625	51,713	51,800	51,888	51,975	52,063	52,150	52,238	52,325	52,413
B		59,168	59,268	59,369	59,469	59,570	59,671	59,771	59,872	59,973	60,073	60,174	60,274
A	10'	52,500	52,588	52,675	52,763	52,850	52,938	53,025	53,113	53,200	53,288	53,375	53,463
B		60,375	60,476	60,576	60,677	60,778	60,878	60,979	61,079	61,180	61,281	61,381	61,482
A	11'	53,550	53,638	53,725	53,813	53,900	53,988	54,075	54,163	54,250	54,338	54,425	54,513
B		61,583	61,683	61,784	61,884	61,985	62,086	62,186	62,287	62,388	62,488	62,589	62,689
A	12'	54,600	54,688	54,775	54,863	54,950	55,038	55,125	55,213	55,300	55,388	55,475	55,563
B		62,790	62,891	62,991	63,092	63,193	63,293	63,394	63,494	63,595	63,696	63,796	63,897
A	13'	55,650	55,738	55,825	55,913	56,000	56,088	56,175	56,263	56,350	56,438	56,525	56,613
B		63,998	64,098	64,199	64,299	64,400	64,501	64,601	64,702	64,803	64,903	65,004	65,104
A	14'	56,700	56,788	56,875	56,963	57,050	57,138	57,225	57,313	57,400	57,488	57,575	57,663
B		65,205	65,306	65,406	65,507	65,608	65,708	65,809	65,909	66,010	66,111	66,211	66,312
A	15'	57,750	57,838	57,925	58,013	58,100	58,188	58,275	58,363	58,450	58,538	58,625	58,713
B		66,413	66,513	66,614	66,714	66,815	66,916	67,016	67,117	67,218	67,318	67,419	67,519
A	16'	58,800	58,888	58,975	59,063	59,150	59,238	59,325	59,413	59,500	59,588	59,675	59,763
B		67,620	67,721	67,821	67,922	68,023	68,123	68,224	68,324	68,425	68,526	68,626	68,727
A	17'	59,850	59,938	60,025	60,113	60,200	60,288	60,375	60,463	60,550	60,638	60,725	60,813
B		68,828	68,928	69,029	69,129	69,230	69,331	69,431	69,532	69,633	69,733	69,834	69,934
A	18'	60,900											
B		70,035											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight only.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 15%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.01 repealed; new Table 3.01 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.02. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 3 Inches

Maximum allowable axle group weights determined by using the computation formula:  $Weight = 1.5 \times 700 (L + 40)$ , where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3' ↓	28,525	28,525	28,525	28,525	28,525	46,442	46,531	46,621	46,710	46,799	46,888	46,977
B		32,550	32,550	32,550	32,550	32,550	52,995	53,097	53,199	53,301	53,402	53,504	53,606
A	4'	47,066	47,155	47,245	47,334	47,423	47,512	47,601	47,690	47,779	47,869	47,958	48,047
B		53,708	53,809	53,911	54,013	54,114	54,216	54,318	54,420	54,521	54,623	54,725	54,826
A	5'	48,136	48,225	48,314	48,403	48,493	48,582	48,671	48,760	48,849	48,938	49,027	49,116
B		54,928	55,030	55,132	55,233	55,335	55,437	55,538	55,640	55,742	55,844	55,945	56,047
A	6'	49,206	49,295	49,384	49,473	49,562	49,651	49,740	49,830	49,919	50,008	50,097	50,186
B		56,149	56,250	56,352	56,454	56,556	56,657	56,759	56,861	56,963	57,064	57,166	57,268
A	7'	50,275	50,364	50,454	50,543	50,632	50,721	50,810	50,899	50,988	51,078	51,167	51,256
B		57,369	57,471	57,573	57,675	57,776	57,878	57,980	58,081	58,183	58,285	58,387	58,488
A	8'	51,345	51,434	51,523	51,612	51,702	51,791	51,880	51,969	52,058	52,147	52,236	52,326
B		58,590	58,692	58,793	58,895	58,997	59,099	59,200	59,302	59,404	59,505	59,607	59,709
A	9'	52,415	52,504	52,593	52,682	52,771	52,860	52,950	53,039	53,128	53,217	53,306	53,395
B		59,811	59,912	60,014	60,116	60,218	60,319	60,421	60,523	60,624	60,726	60,828	60,930
A	10'	53,484	53,574	53,663	53,752	53,841	53,930	54,019	54,108	54,198	54,287	54,376	54,465
B		61,031	61,133	61,235	61,336	61,438	61,540	61,642	61,743	61,845	61,947	62,048	62,150
A	11'	54,554	54,643	54,732	54,821	54,911	55,000	55,089	55,178	55,267	55,356	55,445	55,535
B		62,252	62,354	62,455	62,557	62,659	62,760	62,862	62,964	63,066	63,167	63,269	63,371
A	12'	55,624	55,713	55,802	55,891	55,980	56,069	56,159	56,248	56,337	56,426	56,515	56,604
B		63,473	63,574	63,676	63,778	63,879	63,981	64,083	64,185	64,286	64,388	64,490	64,591
A	13'	56,693	56,783	56,872	56,961	57,050	57,139	57,228	57,317	57,407	57,496	57,585	57,674
B		64,693	64,795	64,897	64,998	65,100	65,202	65,303	65,405	65,507	65,609	65,710	65,812
A	14'	57,763	57,852	57,941	58,031	58,120	58,209	58,298	58,387	58,476	58,565	58,655	58,744
B		65,914	66,015	66,117	66,219	66,321	66,422	66,524	66,626	66,728	66,829	66,931	67,033
A	15'	58,833	58,922	59,011	59,100	59,189	59,279	59,368	59,457	59,546	59,635	59,724	59,813
B		67,134	67,236	67,338	67,440	67,541	67,643	67,745	67,846	67,948	68,050	68,152	68,253
A	16'	59,903	59,992	60,081	60,170	60,259	60,348	60,437	60,526	60,616	60,705	60,794	60,883
B		68,355	68,457	68,558	68,660	68,762	68,864	68,965	69,067	69,169	69,270	69,372	69,474
A	17'	60,972	61,061	61,150	61,240	61,329	61,418	61,507	61,596	61,685	61,774	61,864	61,953
B		69,576	69,677	69,779	69,881	69,983	70,084	70,186	70,288	70,389	70,491	70,593	70,695
A	18'	62,042											
B		70,796											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 1.875%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 16.25%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.02 repealed; new Table 3.02 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).



CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.03. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 6 Inches

Maximum allowable axle group weights determined by using the computation formula: Weight = 1.5 X 700 (L + 40), where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3'	29,050	29,050	29,050	29,050	29,050	47,297	47,388	47,479	47,569	47,660	47,751	47,842
B		32,900	32,900	32,900	32,900	32,900	53,565	53,668	53,771	53,874	53,977	54,079	54,182
A	4'	47,933	48,023	48,114	48,205	48,296	48,386	48,477	48,568	48,659	48,750	48,840	48,931
B		54,285	54,388	54,491	54,593	54,696	54,799	54,902	55,005	55,108	55,210	55,313	55,416
A	5'	49,022	49,113	49,203	49,294	49,385	49,476	49,567	49,657	49,748	49,839	49,930	50,020
B		55,519	55,622	55,724	55,827	55,930	56,033	56,136	56,238	56,341	56,444	56,547	56,650
A	6'	50,111	50,202	50,293	50,384	50,474	50,565	50,656	50,747	50,838	50,928	51,019	51,110
B		56,753	56,855	56,958	57,061	57,164	57,267	57,369	57,472	57,575	57,678	57,781	57,883
A	7'	51,201	51,291	51,382	51,473	51,564	51,655	51,745	51,836	51,927	52,018	52,108	52,199
B		57,986	58,089	58,192	58,295	58,398	58,500	58,603	58,706	58,809	58,912	59,014	59,117
A	8'	52,290	52,381	52,472	52,562	52,653	52,744	52,835	52,925	53,016	53,107	53,198	53,289
B		59,220	59,323	59,426	59,528	59,631	59,734	59,837	59,940	60,043	60,145	60,248	60,351
A	9'	53,379	53,470	53,561	53,652	53,743	53,833	53,924	54,015	54,106	54,196	54,287	54,378
B		60,454	60,557	60,659	60,762	60,865	60,968	61,071	61,173	61,276	61,379	61,482	61,585
A	10'	54,469	54,560	54,650	54,741	54,832	54,923	55,013	55,104	55,195	55,286	55,377	55,467
B		61,688	61,790	61,893	61,996	62,099	62,202	62,304	62,407	62,510	62,613	62,716	62,818
A	11'	55,558	55,649	55,740	55,830	55,921	56,012	56,103	56,194	56,284	56,375	56,466	56,557
B		62,921	63,024	63,127	63,230	63,333	63,435	63,538	63,641	63,744	63,847	63,949	64,052
A	12'	56,648	56,738	56,829	56,920	57,011	57,101	57,192	57,283	57,374	57,465	57,555	57,646
B		64,155	64,258	64,361	64,463	64,566	64,669	64,772	64,875	64,978	65,080	65,183	65,286
A	13'	57,737	57,828	57,918	58,009	58,100	58,191	58,282	58,372	58,463	58,554	58,645	58,735
B		65,389	65,492	65,594	65,697	65,800	65,903	66,006	66,108	66,211	66,314	66,417	66,520
A	14'	58,826	58,917	59,008	59,099	59,189	59,280	59,371	59,462	59,553	59,643	59,734	59,825
B		66,623	66,725	66,828	66,931	67,034	67,137	67,239	67,342	67,445	67,548	67,651	67,753
A	15'	59,916	60,006	60,097	60,188	60,279	60,370	60,460	60,551	60,642	60,733	60,823	60,914
B		67,856	67,959	68,062	68,165	68,268	68,370	68,473	68,576	68,679	68,782	68,884	68,987
A	16'	61,005	61,096	61,187	61,277	61,368	61,459	61,550	61,640	61,731	61,822	61,913	62,004
B		69,090	69,193	69,296	69,398	69,501	69,604	69,707	69,810	69,913	70,015	70,118	70,221
A	17'	62,094	62,185	62,276	62,367	62,458	62,548	62,639	62,730	62,821	62,911	63,002	63,093
B		70,324	70,427	70,529	70,632	70,735	70,838	70,941	71,043	71,146	71,249	71,352	71,455
A	18'	63,184											
B		71,558											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 3.75%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 17.5%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.03 repealed; new Table 3.03 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**Table 3.04. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 8 Feet 9 Inches**

Maximum allowable axle group weights determined by using the computation formula:  $Weight = 1.5 \times 700 (L + 40)$ , where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3'	29,575	29,575	29,575	29,575	29,575	48,152	48,244	48,337	48,429	48,521	48,614	48,706
B		33,250	33,250	33,250	33,250	33,250	54,135	54,239	54,343	54,447	54,551	54,655	54,759
A	4'	48,799	48,891	48,984	49,076	49,168	49,261	49,353	49,446	49,538	49,631	49,723	49,815
B		54,863	54,966	55,070	55,174	55,278	55,382	55,486	55,590	55,694	55,798	55,902	56,005
A	5'	49,908	50,000	50,093	50,185	50,278	50,370	50,462	50,555	50,647	50,740	50,832	50,924
B		56,109	56,213	56,317	56,421	56,525	56,629	56,733	56,837	56,941	57,045	57,148	57,252
A	6'	51,017	51,109	51,202	51,294	51,387	51,479	51,571	51,664	51,756	51,849	51,941	52,034
B		57,356	57,460	57,564	57,668	57,772	57,876	57,980	58,084	58,188	58,291	58,395	58,499
A	7'	52,126	52,218	52,311	52,403	52,496	52,588	52,680	52,773	52,865	52,958	53,050	53,143
B		58,603	58,707	58,811	58,915	59,019	59,123	59,227	59,330	59,434	59,538	59,642	59,746
A	8'	53,235	53,327	53,420	53,512	53,605	53,697	53,790	53,882	53,974	54,067	54,159	54,252
B		59,850	59,954	60,058	60,162	60,266	60,370	60,473	60,577	60,681	60,785	60,889	60,993
A	9'	54,344	54,436	54,529	54,621	54,714	54,806	54,899	54,991	55,083	55,176	55,268	55,361
B		61,097	61,201	61,305	61,409	61,513	61,616	61,720	61,824	61,928	62,032	62,136	62,240
A	10'	55,453	55,546	55,638	55,730	55,823	55,915	56,008	56,100	56,193	56,285	56,377	56,470
B		62,344	62,448	62,552	62,655	62,759	62,863	62,967	63,071	63,175	63,279	63,383	63,487
A	11'	56,562	56,655	56,747	56,839	56,932	57,024	57,117	57,209	57,302	57,394	57,486	57,579
B		63,591	63,695	63,798	63,902	64,006	64,110	64,214	64,318	64,422	64,526	64,630	64,734
A	12'	57,671	57,764	57,856	57,949	58,041	58,133	58,226	58,318	58,411	58,503	58,595	58,688
B		64,838	64,941	65,045	65,149	65,253	65,357	65,461	65,565	65,669	65,773	65,877	65,980
A	13'	58,780	58,873	58,965	59,058	59,150	59,242	59,335	59,427	59,520	59,612	59,705	59,797
B		66,084	66,188	66,292	66,396	66,500	66,604	66,708	66,812	66,916	67,020	67,123	67,227
A	14'	59,889	59,982	60,074	60,167	60,259	60,351	60,444	60,536	60,629	60,721	60,814	60,906
B		67,331	67,435	67,539	67,643	67,747	67,851	67,955	68,059	68,163	68,266	68,370	68,474
A	15'	60,998	61,091	61,183	61,276	61,368	61,461	61,553	61,645	61,738	61,830	61,923	62,015
B		68,578	68,682	68,786	68,890	68,994	69,098	69,202	69,305	69,409	69,513	69,617	69,721
A	16'	62,108	62,200	62,292	62,385	62,477	62,570	62,662	62,754	62,847	62,939	63,032	63,124
B		69,825	69,929	70,033	70,137	70,241	70,345	70,448	70,552	70,656	70,760	70,864	70,968
A	17'	63,217	63,309	63,401	63,494	63,586	63,679	63,771	63,864	63,956	64,048	64,141	64,233
B		71,072	71,176	71,280	71,384	71,488	71,591	71,695	71,799	71,903	72,007	72,111	72,215
A	18'	64,326											
B		72,319											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 5.625%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 18.75%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.04 repealed; new Table 3.04 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.05. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 0 Inches

Maximum allowable axle group weights determined by using the computation formula: Weight = 1.5 X 700 (L + 40), where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3' ↓	30,100	30,100	30,100	30,100	30,100	49,007	49,101	49,195	49,289	49,383	49,477	49,571
B		33,600	33,600	33,600	33,600	33,600	54,705	54,810	54,915	55,020	55,125	55,230	55,335
A	4'	49,665	49,759	49,853	49,947	50,041	50,135	50,229	50,323	50,418	50,512	50,606	50,700
B		55,440	55,545	55,650	55,755	55,860	55,965	56,070	56,175	56,280	56,385	56,490	56,595
A	5'	50,794	50,888	50,982	51,076	51,170	51,264	51,358	51,452	51,546	51,640	51,734	51,828
B		56,700	56,805	56,910	57,015	57,120	57,225	57,330	57,435	57,540	57,645	57,750	57,855
A	6'	51,923	52,017	52,111	52,205	52,299	52,393	52,487	52,581	52,675	52,769	52,863	52,957
B		57,960	58,065	58,170	58,275	58,380	58,485	58,590	58,695	58,800	58,905	59,010	59,115
A	7'	53,051	53,145	53,239	53,333	53,428	53,522	53,616	53,710	53,804	53,898	53,992	54,086
B		59,220	59,325	59,430	59,535	59,640	59,745	59,850	59,955	60,060	60,165	60,270	60,375
A	8'	54,180	54,274	54,368	54,462	54,556	54,650	54,744	54,838	54,933	55,027	55,121	55,215
B		60,480	60,585	60,690	60,795	60,900	61,005	61,110	61,215	61,320	61,425	61,530	61,635
A	9'	55,309	55,403	55,497	55,591	55,685	55,779	55,873	55,967	56,061	56,155	56,249	56,343
B		61,740	61,845	61,950	62,055	62,160	62,265	62,370	62,475	62,580	62,685	62,790	62,895
A	10'	56,438	56,532	56,626	56,720	56,814	56,908	57,002	57,096	57,190	57,284	57,378	57,472
B		63,000	63,105	63,210	63,315	63,420	63,525	63,630	63,735	63,840	63,945	64,050	64,155
A	11'	57,566	57,660	57,754	57,848	57,943	58,037	58,131	58,225	58,319	58,413	58,507	58,601
B		64,260	64,365	64,470	64,575	64,680	64,785	64,890	64,995	65,100	65,205	65,310	65,415
A	12'	58,695	58,789	58,883	58,977	59,071	59,165	59,259	59,353	59,448	59,542	59,636	59,730
B		65,520	65,625	65,730	65,835	65,940	66,045	66,150	66,255	66,360	66,465	66,570	66,675
A	13'	59,824	59,918	60,012	60,106	60,200	60,294	60,388	60,482	60,576	60,670	60,764	60,858
B		66,780	66,885	66,990	67,095	67,200	67,305	67,410	67,515	67,620	67,725	67,830	67,935
A	14'	60,953	61,047	61,141	61,235	61,329	61,423	61,517	61,611	61,705	61,799	61,893	61,987
B		68,040	68,145	68,250	68,355	68,460	68,565	68,670	68,775	68,880	68,985	69,090	69,195
A	15'	62,081	62,175	62,269	62,363	62,458	62,552	62,646	62,740	62,834	62,928	63,022	63,116
B		69,300	69,405	69,510	69,615	69,720	69,825	69,930	70,035	70,140	70,245	70,350	70,455
A	16'	63,210	63,304	63,398	63,492	63,586	63,680	63,774	63,868	63,963	64,057	64,151	64,245
B		70,560	70,665	70,770	70,875	70,980	71,085	71,190	71,295	71,400	71,505	71,610	71,715
A	17'	64,339	64,433	64,527	64,621	64,715	64,809	64,903	64,997	65,091	65,185	65,279	65,373
B		71,820	71,925	72,030	72,135	72,240	72,345	72,450	72,555	72,660	72,765	72,870	72,975
A	18'	65,468											
B		73,080											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 7.5%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 20%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.05 repealed; new Table 3.05 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.06. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 3 Inches

Maximum allowable axle group weights determined by using the computation formula: Weight = 1.5 X 700 (L + 40), where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0"→	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3'	30,625	30,625	30,625	30,625	30,625	49,861	49,957	50,053	50,148	50,244	50,340	50,436
B		33,950	33,950	33,950	33,950	33,950	55,275	55,381	55,487	55,593	55,699	55,805	55,911
A	4'	50,531	50,627	50,723	50,818	50,914	51,010	51,105	51,201	51,297	51,393	51,488	51,584
B		56,018	56,124	56,230	56,336	56,442	56,548	56,654	56,760	56,866	56,972	57,078	57,185
A	5'	51,680	51,775	51,871	51,967	52,063	52,158	52,254	52,350	52,445	52,541	52,637	52,732
B		57,291	57,397	57,503	57,609	57,715	57,821	57,927	58,033	58,139	58,245	58,352	58,458
A	6'	52,828	52,924	53,020	53,115	53,211	53,307	53,402	53,498	53,594	53,689	53,785	53,881
B		58,564	58,670	58,776	58,882	58,988	59,094	59,200	59,306	59,413	59,519	59,625	59,731
A	7'	53,977	54,072	54,168	54,264	54,359	54,455	54,551	54,646	54,742	54,838	54,934	55,029
B		59,837	59,943	60,049	60,155	60,261	60,367	60,473	60,580	60,686	60,792	60,898	61,004
A	8'	55,125	55,221	55,316	55,412	55,508	55,604	55,699	55,795	55,891	55,986	56,082	56,178
B		61,110	61,216	61,322	61,428	61,534	61,640	61,747	61,853	61,959	62,065	62,171	62,277
A	9'	56,273	56,369	56,465	56,561	56,656	56,752	56,848	56,943	57,039	57,135	57,230	57,326
B		62,383	62,489	62,595	62,701	62,808	62,914	63,020	63,126	63,232	63,338	63,444	63,550
A	10'	57,422	57,518	57,613	57,709	57,805	57,900	57,996	58,092	58,188	58,283	58,379	58,475
B		63,656	63,762	63,868	63,975	64,081	64,187	64,293	64,399	64,505	64,611	64,717	64,823
A	11'	58,570	58,666	58,762	58,857	58,953	59,049	59,145	59,240	59,336	59,432	59,527	59,623
B		64,929	65,035	65,142	65,248	65,354	65,460	65,566	65,672	65,778	65,884	65,990	66,096
A	12'	59,719	59,814	59,910	60,006	60,102	60,197	60,293	60,389	60,484	60,580	60,676	60,771
B		66,203	66,309	66,415	66,521	66,627	66,733	66,839	66,945	67,051	67,157	67,263	67,370
A	13'	60,867	60,963	61,059	61,154	61,250	61,346	61,441	61,537	61,633	61,729	61,824	61,920
B		67,476	67,582	67,688	67,794	67,900	68,006	68,112	68,218	68,324	68,430	68,537	68,643
A	14'	62,016	62,111	62,207	62,303	62,398	62,494	62,590	62,686	62,781	62,877	62,973	63,068
B		68,749	68,855	68,961	69,067	69,173	69,279	69,385	69,491	69,598	69,704	69,810	69,916
A	15'	63,164	63,260	63,355	63,451	63,547	63,643	63,738	63,834	63,930	64,025	64,121	64,217
B		70,022	70,128	70,234	70,340	70,446	70,552	70,658	70,765	70,871	70,977	71,083	71,189
A	16'	64,313	64,408	64,504	64,600	64,695	64,791	64,887	64,982	65,078	65,174	65,270	65,365
B		71,295	71,401	71,507	71,613	71,719	71,825	71,932	72,038	72,144	72,250	72,356	72,462
A	17'	65,461	65,557	65,652	65,748	65,844	65,939	66,035	66,131	66,227	66,322	66,418	66,514
B		72,568	72,674	72,780	72,886	72,993	73,099	73,205	73,311	73,417	73,523	73,629	73,735
A	18'	66,609											
B		73,841											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 9.375%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 21.25%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.06 repealed; new Table 3.06 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.07. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 6 Inches

Maximum allowable axle group weights determined by using the computation formula: Weight = 1.5 X 700 (L + 40), where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0"→	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3' ↓	31,150	31,150	31,150	31,150	31,150	50,716	50,813	50,911	51,008	51,105	51,203	51,300
B		34,300	34,000	34,300	34,300	34,300	55,845	55,952	56,059	56,166	56,273	56,381	56,488
A	4'	51,398	51,495	51,592	51,690	51,787	51,884	51,982	52,079	52,176	52,274	52,371	52,468
B		56,595	56,702	56,809	56,917	57,024	57,131	57,238	57,345	57,453	57,560	57,667	57,774
A	5'	52,566	52,663	52,760	52,858	52,955	53,052	53,150	53,247	53,344	53,442	53,539	53,636
B		57,881	57,988	58,096	58,203	58,310	58,417	58,524	58,632	58,739	58,846	58,953	59,060
A	6'	53,734	53,831	53,928	54,026	54,123	54,220	54,318	54,415	54,513	54,610	54,707	54,805
B		59,168	59,275	59,382	59,489	59,596	59,703	59,811	59,918	60,025	60,132	60,239	60,347
A	7'	54,902	54,999	55,097	55,194	55,291	55,389	55,486	55,583	55,681	55,778	55,875	55,973
B		60,454	60,561	60,668	60,775	60,883	60,990	61,097	61,204	61,311	61,418	61,526	61,633
A	8'	56,070	56,167	56,265	56,362	56,459	56,557	56,654	56,751	56,849	56,946	57,043	57,141
B		61,740	61,847	61,954	62,062	62,169	62,276	62,383	62,490	62,598	62,705	62,812	62,919
A	9'	57,238	57,335	57,433	57,530	57,628	57,725	57,822	57,920	58,017	58,114	58,212	58,309
B		63,026	63,133	63,241	63,348	63,455	63,562	63,669	63,777	63,884	63,991	64,098	64,205
A	10'	58,406	58,504	58,601	58,698	58,796	58,893	58,990	59,088	59,185	59,282	59,380	59,477
B		64,313	64,420	64,527	64,634	64,741	64,848	64,956	65,063	65,170	65,277	65,384	65,492
A	11'	59,574	59,672	59,769	59,866	59,964	60,061	60,158	60,256	60,353	60,450	60,548	60,645
B		65,599	65,706	65,813	65,920	66,028	66,135	66,242	66,349	66,456	66,563	66,671	66,778
A	12'	60,743	60,840	60,937	61,035	61,132	61,229	61,327	61,424	61,521	61,619	61,716	61,813
B		66,885	66,992	67,099	67,207	67,314	67,421	67,528	67,635	67,743	67,850	67,957	68,064
A	13'	61,911	62,008	62,105	62,203	62,300	62,397	62,495	62,592	62,689	62,787	62,884	62,981
B		68,171	68,278	68,386	68,493	68,600	68,707	68,814	68,922	69,029	69,136	69,243	69,350
A	14'	63,079	63,176	63,273	63,371	63,468	63,565	63,663	63,760	63,858	63,955	64,052	64,150
B		69,458	69,565	69,672	69,779	69,886	69,993	70,101	70,208	70,315	70,422	70,529	70,637
A	15'	64,247	64,344	64,442	64,539	64,636	64,734	64,831	64,928	65,026	65,123	65,220	65,318
B		70,744	70,851	70,958	71,065	71,173	71,280	71,387	71,494	71,601	71,708	71,816	71,923
A	16'	65,415	65,512	65,610	65,707	65,804	65,902	65,999	66,096	66,194	66,291	66,388	66,486
B		72,030	72,137	72,244	72,352	72,459	72,566	72,673	72,780	72,888	72,995	73,102	73,209
A	17'	66,583	66,680	66,778	66,875	66,973	67,070	67,167	67,265	67,362	67,459	67,557	67,654
B		73,316	73,423	73,531	73,638	73,745	73,852	73,959	74,067	74,174	74,281	74,388	74,495
A	18'	67,751											
B		74,603											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 11.25%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 22.5%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.07 repealed; new Table 3.07 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 3.08. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 9 Feet 9 Inches

Maximum allowable axle group weights determined by using the computation formula:  $Weight = 1.5 \times 700 (L + 40)$ , where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0" →	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3' ↓	31,675	31,675	31,675	31,675	31,675	51,571	51,670	51,769	51,868	51,967	52,066	52,165
B		34,650	34,650	34,650	34,650	34,650	56,415	56,523	56,631	56,739	56,848	56,956	57,064
A	4'	52,264	52,363	52,462	52,561	52,660	52,759	52,858	52,957	53,056	53,155	53,254	53,353
B		57,173	57,281	57,389	57,497	57,606	57,714	57,822	57,930	58,039	58,147	58,255	58,364
A	5'	53,452	53,551	53,650	53,749	53,848	53,946	54,045	54,144	54,243	54,342	54,441	54,540
B		58,472	58,580	58,688	58,797	58,905	59,013	59,122	59,230	59,338	59,446	59,555	59,663
A	6'	54,639	54,738	54,837	54,936	55,035	55,134	55,233	55,332	55,431	55,530	55,629	55,728
B		59,771	59,880	59,988	60,096	60,204	60,313	60,421	60,529	60,638	60,746	60,854	60,962
A	7'	55,827	55,926	56,025	56,124	56,223	56,322	56,421	56,520	56,619	56,718	56,817	56,916
B		61,071	61,179	61,287	61,395	61,504	61,612	61,720	61,829	61,937	62,045	62,153	62,262
A	8'	57,015	57,114	57,213	57,312	57,411	57,510	57,609	57,708	57,807	57,906	58,005	58,104
B		62,370	62,478	62,587	62,695	62,803	62,911	63,020	63,128	63,236	63,345	63,453	63,561
A	9'	58,203	58,302	58,401	58,500	58,599	58,698	58,797	58,896	58,995	59,094	59,193	59,292
B		63,669	63,778	63,886	63,994	64,103	64,211	64,319	64,427	64,536	64,644	64,752	64,860
A	10'	59,391	59,490	59,589	59,688	59,787	59,886	59,985	60,084	60,183	60,281	60,380	60,479
B		64,969	65,077	65,185	65,294	65,402	65,510	65,618	65,727	65,835	65,943	66,052	66,160
A	11'	60,578	60,677	60,776	60,875	60,974	61,073	61,172	61,271	61,370	61,469	61,568	61,667
B		66,268	66,376	66,485	66,593	66,701	66,810	66,918	67,026	67,134	67,243	67,351	67,459
A	12'	61,766	61,865	61,964	62,063	62,162	62,261	62,360	62,459	62,558	62,657	62,756	62,855
B		67,568	67,676	67,784	67,892	68,001	68,109	68,217	68,325	68,434	68,542	68,650	68,759
A	13'	62,954	63,053	63,152	63,251	63,350	63,449	63,548	63,647	63,746	63,845	63,944	64,043
B		68,867	68,975	69,083	69,192	69,300	69,408	69,517	69,625	69,733	69,841	69,950	70,058
A	14'	64,142	64,241	64,340	64,439	64,538	64,637	64,736	64,835	64,934	65,033	65,132	65,231
B		70,166	70,275	70,383	70,491	70,599	70,708	70,816	70,924	71,033	71,141	71,249	71,357
A	15'	65,330	65,429	65,528	65,627	65,726	65,825	65,924	66,023	66,122	66,221	66,320	66,419
B		71,466	71,574	71,682	71,790	71,899	72,007	72,115	72,224	72,332	72,440	72,548	72,657
A	16'	66,518	66,616	66,715	66,814	66,913	67,012	67,111	67,210	67,309	67,408	67,507	67,606
B		72,765	72,873	72,982	73,090	73,198	73,306	73,415	73,523	73,631	73,740	73,848	73,956
A	17'	67,705	67,804	67,903	68,002	68,101	68,200	68,299	68,398	68,497	68,596	68,695	68,794
B		74,064	74,173	74,281	74,389	74,498	74,606	74,714	74,822	74,931	75,039	75,147	75,255
A	18'	68,893											
B		75,364											

Legend (Tire measurement excludes any load-induced tire bulge):

Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 13.125%.

Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 23.75%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.08 repealed; new Table 3.08 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**Table 3.09. Maximum Permitted Weight Computations for Overweight Axle Groups - Axle Width 10 Feet 0 Inches**

Maximum allowable axle group weights determined by using the computation formula:  $Weight = 1.5 \times 700 (L + 40)$ , where:  
 L = Distance between the center of the front axle and the center of the rear axle of any group of axles within a space of 3' 5" to 18' 0".

	L =	0"→	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
A	3' ↓	32,200	32,200	32,200	32,200	32,200	52,426	52,526	52,627	52,728	52,828	52,929	53,029
B		35,000	35,000	35,000	35,000	35,000	56,984	57,094	57,203	57,313	57,422	57,531	57,641
A	4'	53,130	53,231	53,331	53,432	53,533	53,633	53,734	53,834	53,935	54,036	54,136	54,237
B		57,750	57,859	57,969	58,078	58,188	58,297	58,406	58,516	58,625	58,734	58,844	58,953
A	5'	54,338	54,438	54,539	54,639	54,740	54,841	54,941	55,042	55,143	55,243	55,344	55,444
B		59,063	59,172	59,281	59,391	59,500	59,609	59,719	59,828	59,938	60,047	60,156	60,266
A	6'	55,545	55,646	55,746	55,847	55,948	56,048	56,149	56,249	56,350	56,451	56,551	56,652
B		60,375	60,484	60,594	60,703	60,813	60,922	61,031	61,141	61,250	61,359	61,469	61,578
A	7'	56,753	56,853	56,954	57,054	57,155	57,256	57,356	57,457	57,558	57,658	57,759	57,859
B		61,688	61,797	61,906	62,016	62,125	62,234	62,344	62,453	62,563	62,672	62,781	62,891
A	8'	57,960	58,061	58,161	58,262	58,363	58,463	58,564	58,664	58,765	58,866	58,966	59,067
B		63,000	63,109	63,219	63,328	63,438	63,547	63,656	63,766	63,875	63,984	64,094	64,203
A	9'	59,168	59,268	59,369	59,469	59,570	59,671	59,771	59,872	59,973	60,073	60,174	60,274
B		64,313	64,422	64,531	64,641	64,750	64,859	64,969	65,078	65,188	65,297	65,406	65,516
A	10'	60,375	60,476	60,576	60,677	60,778	60,878	60,979	61,079	61,180	61,281	61,381	61,482
B		65,625	65,734	65,844	65,953	66,063	66,172	66,281	66,391	66,500	66,609	66,719	66,828
A	11'	61,583	61,683	61,784	61,884	61,985	62,086	62,186	62,287	62,388	62,488	62,589	62,689
B		66,938	67,047	67,156	67,266	67,375	67,484	67,594	67,703	67,813	67,922	68,031	68,141
A	12'	62,790	62,891	62,991	63,092	63,193	63,293	63,394	63,494	63,595	63,696	63,796	63,897
B		68,250	68,359	68,469	68,578	68,688	68,797	68,906	69,016	69,125	69,234	69,344	69,453
A	13'	63,998	64,098	64,199	64,299	64,400	64,501	64,601	64,702	64,803	64,903	65,004	65,104
B		69,563	69,672	69,781	69,891	70,000	70,109	70,219	70,328	70,438	70,547	70,656	70,766
A	14'	65,205	65,306	65,406	65,507	65,608	65,708	65,809	65,909	66,010	66,111	66,211	66,312
B		70,875	70,984	71,094	71,203	71,313	71,422	71,531	71,641	71,750	71,859	71,969	72,078
A	15'	66,413	66,513	66,614	66,714	66,815	66,916	67,016	67,117	67,218	67,318	67,419	67,519
B		72,188	72,297	72,406	72,516	72,625	72,734	72,844	72,953	73,063	73,172	73,281	73,391
A	16'	67,620	67,721	67,821	67,922	68,023	68,123	68,224	68,324	68,425	68,526	68,626	68,727
B		73,500	73,609	73,719	73,828	73,938	74,047	74,156	74,266	74,375	74,484	74,594	74,703
A	17'	68,828	68,928	69,029	69,129	69,230	69,331	69,431	69,532	69,633	69,733	69,834	69,934
B		74,813	74,922	75,031	75,141	75,250	75,359	75,469	75,578	75,688	75,797	75,906	76,016
A	18'	70,035											
B		76,125											

Legend (Tire measurement excludes any load-induced tire bulge):

- Line A: Four tires per axle or two 14-inch wide tires per axle. Value is the formula weight plus 15%.
- Line B: Eight tires per axle or four 14-inch wide tires per axle. Value is the formula weight plus 25%.

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 3.09 repealed; new Table 3.09 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Illustration 3. Repealed**

**Historical Note**

New Illustration 3 made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Illustration 3 amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Illustration 3 codified after Table 3.09 repealed; see new Illustration 3 codified after Section R17-6-411 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-412. Highway-specific Restrictions, Requirements, Conditions, and Allowances**

- A.** The Department may temporarily prohibit operation of an oversize or overweight envelope or special permitted vehicle, or impose additional weight restrictions, requirements, conditions, or allowances, if safe transport on a highway under the Department's jurisdiction is unavoidably affected by a temporary construction or maintenance project, incident, or emergency situation as indicated on the Department's Arizona Traveler Information System at AZ511.gov.
- B.** The Department shall post to its website at [www.azdot.gov](http://www.azdot.gov) all updates to any temporary or permanent highway restrictions, requirements, conditions, or allowances affecting a route listed under Table 4 as appropriate for safe transport of an oversize or overweight vehicle or vehicle and load.
- C.** A permittee and driver shall check the Department's website at [www.azdot.gov](http://www.azdot.gov) daily for updates to any temporary or permanent highway restrictions, requirements, conditions, or allowances affecting safe transport of an oversize or overweight vehicle or vehicle and load on a route listed under Table 4.
- D.** A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under Table 4 unless operating in full compliance with all indicated permanent highway restrictions, requirements, conditions and allowances, including any additional instructions indicated on the envelope or special permit issued by the Department.
- E.** When more than two escort vehicles are required on a route listed under Table 4 due to excess height, length, width, or weight, only two law enforcement escorts are required to ensure the public safety. Multiples of two law enforcement

escorts are not required for each excess dimension unless specifically required under a class C special permit.

- F.** A permittee and driver shall additionally check daily for up-to-date information on traffic conditions, road closures, and restrictions by:
  1. Accessing the Department's Arizona Traveler Information System at AZ511.gov; or
  2. Contacting a highway project engineer at the ADOT district office identified on the Department's website as the office responsible for oversight of the permittee's applicable transport route.
- G.** The information contained in Table 4 reflects highway restrictions, requirements, conditions, and allowances applicable on the effective date of this Section. The Department shall publish real-time updates as an addendum to Table 4 and make those updates available on its website at [www.azdot.gov](http://www.azdot.gov), the Arizona Central Commercial Permits Office, the Class C Unit, and all Arizona Port of Entry locations. This information is critical for ensuring safe transport of an oversize or overweight vehicle or load and is subject to immediate change as provided under this Section.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Table 4. Permanent Highway Restrictions, Requirements, Conditions, and Allowances

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 8	MP 0.00 (California State Line) to MP 21.06 (Dome Valley Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 21.06 Westbound (Dome Valley Road TI Underpass - Structure 1325)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 8	MP 21.06 (Dome Valley Road TI) to MP 30.80 (Avenue 29E - Wellton TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 30.80 Westbound (Avenue 29E - Wellton Underpass - Structure 1332)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 8	MP 30.80 (Avenue 29E - Wellton TI) to MP 144.55 (Vekol Valley Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 144.55 (Vekol Valley Road Underpass - Structure 550)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 8	MP 144.55 (Vekol Valley Road TI) to MP 151.70 (Junction SR 84)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 151.70 Eastbound (Junction SR 84 Underpass - Structure 1063)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 8	MP 151.70 (Junction SR 84) to MP 161.60 (Stanfield Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 161.60 Eastbound (Stanfield Road Underpass - Structure 1090)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 8	MP 161.60 (Stanfield Road TI) to MP 162.50 (Murphy Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 162.50 Westbound (Murphy Road Underpass - Structure 1091)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 8	MP 162.50 (Murphy Road TI) to MP 164.50 (Russell Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 164.50 Eastbound (Russell Road Underpass - Structure 1094)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 8	MP 164.50 (Russell Road TI) to MP 167.50 (Montgomery Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 167.50 Eastbound (Montgomery Road Underpass - Structure 1140)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 8	MP 167.50 (Montgomery Road TI) to MP 172.55 (Thornton Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 172.55 Eastbound (Thornton Road Underpass - Structure 1196)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 8	MP 172.55 Westbound (Thornton Road Underpass - Structure 1196)	R17-6-402; R17-6-403	15' 7"		Over 14' - 16' = R	
Interstate 8	MP 172.55 (Thornton Road TI) to MP 173.53 (Chuichu Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 8	MP 173.53 Eastbound (Chuichu Road Underpass - Structure 1197)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 8	MP 173.53 (Chuichu Road) to MP 178.70 (Junction I-10)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 0.00 (California State Line) to MP 5.84 (Tom Wells Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 5.84 Eastbound (Tom Wells Road Underpass - Structure 767)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 10	MP 5.84 Westbound (Tom Wells Road Underpass - Structure 767)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 5.84 (Tom Wells Road TI) to MP 17.50 (Junction SB 10 - West Quartzsite Blvd)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 17.50 (SB 10 Underpass - West Quartzsite Blvd - Structure 826)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 17.50 (Junction SB 10 - West Quartzsite Blvd) to MP 26.65 (Gold Nugget Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 26.65 Westbound (Gold Nugget Road Underpass - Structure 769)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 10	MP 26.65 (Gold Nugget Road TI) to MP 45.34 (Vicksburg Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 45.34 Westbound (Vicksburg Road Underpass - Structure 1207)	R17-6-402; R17-6-403	15' 7"		Over 14' - 16' = R	
Interstate 10	MP 45.34 Eastbound (Vicksburg Road Underpass - Structure 1207)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 45.34 (Vicksburg Road TI) to MP 69.60 (Avenue 75E TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 69.60 Westbound (Avenue 75E Underpass - Structure 1283)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 69.60 (Avenue 75E TI) to MP 81.21 (Salome Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 81.21 Eastbound (Salome Road Underpass - Structure 1209)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 10	MP 81.21 Westbound (Salome Road Underpass - Structure 1209)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 81.21 (Salome Road TI) to MP 101.40 (355th Avenue)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 101.40 Westbound (355th Avenue Underpass - Structure 1647)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 101.40 (355th Avenue) to MP 133.98 (Junction SR 101 Loop)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 133.98 (Junction SR 101 Loop) to MP 138.76 (Junction SR202 Loop, South Mountain)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 10	MP 138.76 (Junction SR202 Loop, South Mountain) to MP 140.65 (43rd Avenue TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 10	MP 140.65 Eastbound (43rd Avenue Underpass - Structure 1931)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 140.65 (43rd Avenue TI) to MP 161.35 (Junction SR 202 Loop, Santan)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 10	MP 161.35 (Junction SR 202 Loop, Santan) to MP 167.47 (Riggs Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 167.47 (Riggs Road Underpass - Structure 1148)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 167.47 (Riggs Road TI) to MP 169.85 (Goodyear Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 169.85 Eastbound (Goodyear Road Underpass - Structure 1149)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 169.85 (Goodyear Road) to MP 174.63 (Nelson Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 174.63 Eastbound (Nelson Road Underpass - Structure 1213)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 174.63 (Nelson Road) to MP 175.81 (Casa Blanca Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 175.81 (Casa Blanca Road Underpass - Structure 1214)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 175.81 (Casa Blanca Road TI) to MP 177.76 (Gas Line Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 177.76 Eastbound (Gas Line Road Underpass - Structure 1215)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 177.76 (Gas Line Road) to MP 179.39 (Seed Farm Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 10	MP 179.39 Westbound (Seed Farm Road Underpass - Structure 1216)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 10	MP 179.39 (Seed Farm Road) to MP 188.20 (Val Vista Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 188.20 Westbound (Val Vista Underpass - Structure 1152)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 188.20 (Val Vista Road) to MP 190.73 (McCartney Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 190.73 Westbound (McCartney Road Underpass - Structure 1153)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 190.73 (McCartney Road TI) to MP 193.88 (Cottonwood Lane)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 193.88 Eastbound (Cottonwood Lane Underpass - Structure 1154)	R17-6-402; R17-6-403	15' 7"		Over 14' - 16' = R	
Interstate 10	MP 193.88 Westbound (Cottonwood Lane Underpass - Structure 1154)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 193.88 (Cotton- wood Lane) to MP 194.88 (Junction SR 287 - Florence Blvd)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 194.88 Eastbound (Junction SR 287 - Flor- ence Blvd Underpass - Structure 1156)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 194.88 (Junction SR 287 - Florence Blvd) to MP 195.89 (Earley Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 195.89 (Earley Road Underpass - Struc- ture 1158)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 195.89 (Earley Road) to MP 196.89 (Selma Highway)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 196.89 Eastbound (Selma Highway Under- pass - Structure 1160)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 10	MP 196.89 (Selma Highway) to MP 200.12 (Sunland Gin Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 200.12 Eastbound (Sunland Gin Road Underpass - Structure 941)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 200.12 Westbound (Sunland Gin Road Underpass - Structure 941)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 10	MP 200.12 (Sunland Gin Road TI) to MP 203.84 (Toltec Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 203.84 Westbound (Toltec Road Underpass - Structure 2152)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 203.84 (Toltec Road TI) to MP 205.45 (Battaglia Drive)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 205.45 (Battaglia Drive Underpass - Structure 943)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 205.45 (Battaglia Drive) to MP 207.17 (Alsdorf Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 207.17 Westbound (Alsdorf Road Underpass - Structure 944)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 207.17 (Alsdorf Road) to MP 208.79 (Sunshine Blvd TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 208.79 Eastbound (Sunshine Blvd Underpass - Structure 945)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 208.79 Westbound (Sunshine Blvd Underpass - Structure 945)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 208.79 (Sunshine Blvd TI) to MP 226.45 (Red Rock Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 226.45 Westbound (Red Rock Road Underpass - Structure 592)	R17-6-402; R17-6-403	15' 7"		Over 14' - 16' = R	
Interstate 10	MP 226.45 (Red Rock Road TI) to MP 236.42 (Marana Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 236.42 (Marana Road TI) to MP 270.57 (Kolb Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 10	MP 270.57 (Kolb Road TI) to MP 273.14 (Rita Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 273.14 Eastbound (Rita Road Underpass - Structure 711)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 273.14 (Rita Road TI) to MP 275.49 (Houghton Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 275.49 Westbound (Houghton Road Underpass - Structure 713)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 275.49 (Houghton Road TI) to MP 279.37 (Vail/Wentworth TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 279.37 Eastbound (Vail/Wentworth Underpass - Structure 744)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 279.37 (Vail/Wentworth TI) to MP 297.17 (Mescal Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 10	MP 297.17 Westbound (Mescal Road Underpass - Structure 517)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 297.17 (Mescal Road TI) to MP 339.46 (Airport Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 339.46 Eastbound (Airport Road Underpass - Structure 1114)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = R	
Interstate 10	MP 339.46 (Airport Road) to MP 378.93 (Junction SB 10, West of San Simon)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 378.93 Eastbound (SB 10 Underpass, West of San Simon - Structure 1164)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 10	MP 378.93 Westbound (SB 10 Underpass, West of San Simon - Structure 1164)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 10	MP 378.93 (Junction SB 10, West of San Simon) to MP 382.35 (Junction SB 10, East of San Simon)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10	MP 382.35 Eastbound (SB 10 Underpass, East of San Simon - Structure 1169)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 10	MP 382.35 (Junction SB 10, East of San Simon) to MP 391.23 (New Mexico State Line)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 10 (Frontage Road)	MP 258.64 (Congress Street TI) to MP 259.34 (22nd Street TI)	R17-6-402; R17-6-403	*14' 6"		Over 14' - 16' = R	*Light rail - low electric cables.
Interstate 15	MP 0.00 (Nevada State Line) to MP 15.38 (Virgin River Bridge # 5)	R17-6-402; R17-6-403		Over 100' non-articulated = F/R + 2 LE	Over 14' - 16' = F/R + 2 LE	
Interstate 15	MP 15.38 Northbound (Virgin River Bridge #5 - Structure 1617)	R17-6-402; R17-6-403		Over 100' non-articulated = F/R + 2 LE	Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 15	MP 15.50 Southbound (Virgin River Bridge #5 - Structure 1618)	R17-6-402; R17-6-403		Over 100' non- articulated = F/ R + 2 LE	Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require spe- cial analysis and approval from the ADOT Bridge Group.
Interstate 15	MP 15.38 (Virgin River Bridge #5) to MP 29.40 (Utah State Line)	R17-6-402; R17-6-403		Over 100' non- articulated = F/ R + 2 LE	Over 14' - 16' = F/R + 2 LE	
Interstate 17	MP 193.94 (Junction I- 10 and SR51) to MP 198.84 (Buckeye Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 17	MP 198.84 (Buckeye Road Underpass - Struc- ture 607)	R17-6-402; R17-6-403; R17-6-404	15' 8"		Over 14' - 16' = R	
Interstate 17	MP 198.84 (Buckeye Road TI) to MP 199.15 (Grant Street TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 17	MP 199.15 (Grant Street Underpass - Structure 555)	R17-6-402; R17-6-403; R17-6-404	15' 5"		Over 14' - 16' = R	
Interstate 17	MP 199.15 (Grant Street TI) to MP 199.35 (Rail- road Underpass)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 17	MP 199.35 (Railroad Underpass - Structure 600)	R17-6-402; R17-6-403; R17-6-404	15' 8"		Over 14' - 16' = R	
Interstate 17	MP 199.35 (Railroad Underpass) to MP 199.56 (Jefferson Street TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 17	MP 199.56 Northbound (Jefferson Street Under- pass - Structure 554)	R17-6-402; R17-6-403; R17-6-404	15' 8"		Over 14' - 16' = R	
Interstate 17	MP 199.56 Southbound (Jefferson Street Under- pass - Structure 554)	R17-6-402; R17-6-403; R17-6-404	15' 7"		Over 14' - 16' = R	
Interstate 17	MP 199.56 (Jefferson Street TI) to MP 214.96 (Junction SR 101 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 17	MP 214.96 (Junction SR 101 Loop) to MP 221.94 (Junction SR 303 Loop - Sonoran Desert Drive TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 17	MP 221.94 (Junction SR 303 Loop - Sonoran Desert Drive TI) to MP 223.99 (Junction SR 74)	R17-6-402; R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 17	MP 224.00 Southbound (Carefree Highway Underpass - Structure 2845)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = R	
Interstate 17	MP 224.00 (Carefree Highway TI) to MP 229.07 (Anthem Road)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = R	
Interstate 17	MP 229.07 (Anthem Road) to MP 235.94 (Table Mesa Road TI)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = F/R	
Interstate 17	MP 235.94 Southbound (Table Mesa Road Underpass - Structure 1294)	R17-6-402; R17-6-403; R17-6-407	15' 10"		Over 14' - 16' = F/R	
Interstate 17	MP 235.94 (Table Mesa Road TI) to MP 242.15 (Rock Springs Road TI)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = F/R	
Interstate 17	MP 242.15 (Rock Springs Road Underpass - Structures 969 & 970)	R17-6-402; R17-6-403; R17-6-407	15' 9"		Over 14' - 16' = R	
Interstate 17	MP 242.15 (Rock Springs Road TI) to MP 289.97 (Middle Verde Road TI)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = R	
Interstate 17	MP 289.97 Northbound (Middle Verde Road Underpass - Structure 1733)	R17-6-402; R17-6-403; R17-6-407	15' 11"		Over 14' - 16' = R	
Interstate 17	MP 289.97 (Middle Verde Road TI) to MP 293.26 (Cornville Road TI)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = R	
Interstate 17	MP 293.26 Southbound (Cornville Road Under- pass - Structure 652)	R17-6-402; R17-6-403; R17-6-407	14' 9"		Over 14' - 16' = R	
Interstate 17	MP 293.26 (Cornville Road TI) to MP 340.05 (End of route at Junction I-40)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = R	
Interstate 19	MP 0.00 / KP 0.00 (US/ Mexico Border) to MP 13.93 / KP 22.42 (Peck Canyon Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 19	MP 13.93 / KP 22.42 Northbound (Peck Can- yion Road Underpass - Structure 935)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 19	MP 13.93 / KP 22.42 (Peck Canyon Road TI) to MP 26.53 / KP 42.69 (Agua Linda Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 19	MP 26.53 / KP 42.69 Northbound (Agua Linda Road Underpass - Structure 1739)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 19	MP 26.53 / KP 42.69 (Agua Linda Road TI) to MP 58.80 / KP 94.62 (Valencia Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	



CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 19	MP 58.80 / KP 94.62 (Valencia Road TI) to MP 60.85 / KP 97.92 (Irvington Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 19	MP 60.85 / KP 97.92 Southbound (Irvington Road Underpass - Structure 1123)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
Interstate 19	MP 60.85 / KP 97.92 (Irvington Road TI) to MP 61.85 / KP 99.53 (Junction SR 86 - Ajo Way TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 19	MP 61.85 / KP 99.53 Southbound (Junction SR 86 - Ajo Way Underpass - Structure 1125)	R17-6-402; R17-6-403; R17-6-404	15' 10"		Over 14' - 16' = R	
Interstate 19	MP 61.85 / KP 99.53 (Junction SR 86 - Ajo Way TI) to MP 63.43 / KP 102.08 (Junction I-10)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
Interstate 40	MP 0.00 (California State Line) to MP 3.01 Westbound (Needle Mountain Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 3.01 Westbound (Needle Mountain Road Underpass - Structure 1756)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 40	MP 3.01 Westbound (Needle Mountain Road TI) to MP 26.17 (Proving Ground Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 26.17 Eastbound (Proving Ground Road Underpass - Structure 923)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 26.17 (Proving Ground Road TI) to MP 37.03 (Griffith Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 37.03 Eastbound (Griffith Road Underpass - Structure 928)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 37.03 (Griffith Road TI) to MP 87.57 (Willow Ranch Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 87.57 Westbound (Willow Ranch Road Underpass - Structure 1770)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 40	MP 87.57 (Willow Ranch Road TI) to MP 117.87 (Canyon Mouth Dam Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 117.87 Eastbound (Canyon Mouth Dam Road Underpass - Structure 1256)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 40	MP 117.87 (Canyon Mouth Dam Road) to MP 121.07 (Junction SB 40, West of Seligman)	R17-6-402; R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 40	MP 121.07 Eastbound (Junction SB 40 Underpass - Structure 1258)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 121.07 (Junction SB 40, West of Seligman) to MP 139.88 (Crookton Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 139.88 Westbound (Crookton Road Underpass - Structure 1177)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 40	MP 139.88 (Crookton Road TI) to MP 178.24 (Parks Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 178.24 Eastbound (Parks Road Underpass - Structure 743)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 178.24 (Parks Road TI) to MP 204.87 (Walnut Canyon Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 204.87 Eastbound (Walnut Canyon Road Underpass - Structure 1270)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 40	MP 204.87 Westbound (Walnut Canyon Road Underpass - Structure 1271)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 40	MP 204.87 (Walnut Canyon Road TI) to MP 280.64 (Hunt Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 280.64 Westbound (Hunt Road Underpass - Structure 930)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 280.64 (Hunt Road TI) to MP 294.55 Eastbound (Sun Valley Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	294.55 Eastbound (Sun Valley Road Underpass - Structure 931)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 40	MP 294.55 Eastbound (Sun Valley Road TI) to MP 320.00 (Pinta Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 320.00 Westbound (Pinta Road Underpass - Structure 708)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 40	MP 320.00 (Pinta Road TI) to MP 325.92 (Navajo Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 325.92 Eastbound (Navajo Road Underpass - Structure 709)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 325.92 Westbound (Navajo Road Underpass - Structure 709)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
Interstate 40	MP 325.92 (Navajo Road TI) to MP 330.00 (Mc Carrell Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
Interstate 40	MP 330.00 (Mc Carrell Road Underpass - Structure 710)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 330.00 (Mc Carrell Road TI) to MP 341.81 (Ortega Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 341.81 Westbound (Ortega Road Underpass - Structure 816)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 341.81 (Ortega Road TI) to MP 343.83 (Querino Road TI)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 343.83 Eastbound (Querino Road Underpass - Structure 951)	R17-6-402; R17-6-403	15' 10"		Over 14' - 16' = R	
Interstate 40	MP 343.83 (Querino Road TI) to MP 348.16 (St. Anselm Road TI - Houck)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40	MP 348.16 Eastbound (St. Anselm Road Underpass - Structure 955)	R17-6-402; R17-6-403	15' 11"		Over 14' - 16' = R	
Interstate 40	MP 348.16 (St. Anselm Road TI - Houck) to MP 359.63 (New Mexico State Line)	R17-6-402; R17-6-403			Over 14' - 16' = R	
Interstate 40 (Frontage Road)	MP 300.75 - (Little Lithodendron Bridge - South Frontage Road - Structure 2057)	R17-6-403			Over 14' - 16' = R	20,000
State Business 8	MP 0.00 (California State Line) to MP 0.27 (End of route, near 1st Street)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Business 8	MP 117.32 (Gila Bend) to MP 122.98 (Junction I-8)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 17.45 (Junction I-10 - West Main Street) to MP 19.55 (Riggles Road - Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 303.37 (I-10 - 4th Street TI, West of Benson) to MP 303.37 (4th Street - Junction I-10, West of Benson)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 303.37 Westbound (I-10 Underpass - Structures 1346 & 1347)	R17-6-403	15' 0"		Over 14' - 16' = F/R	
State Business 10	MP 303.37 (I-10 - 4th Street TI, West of Benson) to MP 305.79 (Junction SR 80)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 305.79 Eastbound (SR 80 Underpass - Structure 262)	R17-6-403	14'		Over 14' - 16' = F/R	
State Business 10	MP 305.79 Westbound (SR 80 Underpass - Structure 262)	R17-6-403	14' 2"		Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Business 10	MP 305.79 (Junction SR 80) to MP 305.80 (Railroad Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 305.80 Eastbound (Railroad Underpass - Structure 264)	R17-6-403	14'		Over 14' - 16' = F/R	
State Business 10	MP 305.85 Westbound (Railroad Underpass - Structure 264)	R17-6-403	14' 2"		Over 14' - 16' = F/R	
State Business 10	MP 305.85 (Railroad Underpass) to MP 306.45 (San Pedro River Bridge)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 306.45 (San Pedro River Bridge - Structure 350)	R17-6-403			Over 14' - 16' = F/R	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
State Business 10	MP 306.45 (San Pedro River Bridge) to MP 306.98 (End SB 10 at Junction I-10, East of Benson)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 336.39 (Junction I-10, West of Willcox) to MP 340.09 (Junction SR 186)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 340.09 (Junction SR 186) to MP 344.80 (Junction I-10, East of Willcox)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 362.29 (Junction I-10, West of Bowie) to MP 367.00 (Junction I-10, East of Bowie)	R17-6-403			Over 14' - 16' = F/R	
State Business 10	MP 378.48 (Junction I-10, West of San Simon) to MP 382.74 (Junction I-10, East of San Simon)	R17-6-403			Over 14' - 16' = F/R	
State Business 19	MP 0.00 (US/Mexico Border) to MP 1.52 (Junction SR 82)	R17-6-403			Over 14' - 16' = F/R	
State Business 19	MP 1.52 (SR82 & Railroad Underpass - Structure 980)	R17-6-403	15' 3"		Over 14' - 16' = F/R	
State Business 19	MP 1.52 (Junction SR82) to MP 5.88 (End SB 19 at Junction I-19)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 138.81 (West Seligman) to MP 142.20 (I-40 Underpass)	R17-6-403			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Business 40	MP 142.20 (I-40 Underpass - Structure 1007)	R17-6-403	15' 4"		Over 14' - 16' = F/R	
State Business 40	MP 142.20 (I-40 Underpass) to MP 142.21 (Railroad Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 142.21 (Railroad Underpass - Structure 1273)	R17-6-403	15' 3"		Over 14' - 16' = F/R	
State Business 40	MP 142.21 (Railroad Underpass) to MP 143.04 (End SB 40 at I-40 Exit #123)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 144.82 (West Ash Fork) to MP 146.33 (East Ash Fork)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 146.33 (East Ash Fork) to MP 165.28 (Railroad Underpass)	Local Requirements			Local Requirements	Yavapai County Jurisdiction.
State Business 40	MP 165.28 (Railroad Underpass - Structure 1575)	Local Requirements	14' 8"		Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 165.28 (Railroad Underpass) to MP 191.44 (Junction I-40)	Local Requirements			Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.44 (Junction I-40) to MP 191.69 (I-40 Underpass)	Local Requirements			Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.69 Northbound (I-40 East Underpass - Structure 1129)	Local Requirements	15'		Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.69 Southbound (I-40 East Underpass - Structure 1129)	Local Requirements	14' 3"		Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.69 Northbound (I-40 West Underpass - Structure 1128)	Local Requirements	14' 3"		Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.69 Southbound (I-40 West Underpass - Structure 1128)	Local Requirements	15' 8"		Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 191.69 (I-40 Underpass) to MP 193.16 (Flagstaff City Limit)	Local Requirements			Local Requirements	Coconino County Jurisdiction.
State Business 40	MP 193.16 (Flagstaff City Limit) to MP 195.96 (Railroad Underpass)	R17-6-403			Over 12' - 16' = F/R	
State Business 40	MP 195.96 (Railroad Underpass - Structure 529)	R17-6-403	13' 9"		Over 12' - 16' = F/R	
State Business 40	MP 195.96 (Railroad Underpass) to MP 196.14 (Junction US 180)	R17-6-403			Over 12' - 16' = F/R	
State Business 40	MP 196.14 (Junction US 180) to MP 199.91 (Fanning Drive TI)	R17-6-403			Over 12' - 16' = F/R	
State Business 40	MP 199.91 (Fanning Drive TI) to MP 200.99 (Junction I-40)	Local Requirements			Local Requirements	City of Flagstaff Jurisdiction.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Business 40	MP 274.48 (West Joseph City) to MP 277.33 (East Joseph City)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 285.00 (West of Holbrook) to MP 286.68 (Junction SR 77)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 286.68 (Junction SR 77) to MP 287.39 (Holbrook Middle I-40 Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	287.39 (Holbrook Middle I-40 Underpass) to MP 289.80 (I-40 Underpass, East of Holbrook)	R17-6-403			Over 14' - 16' = F/R	
State Business 40	MP 289.80 (I-40 Underpass, East of Holbrook - Structure 1369)	R17-6-403	14' 8"		Over 14' - 16' = F/R	
State Business 40	289.80 (I-40 Underpass, East of Holbrook) to MP 290.06 (I-40 TI, East of Holbrook)	R17-6-403			Over 14' - 16' = F/R	
State Business 79	MP 132.17 (Junction SR 79) to MP 134.03 (Junction SR 79)	R17-6-403			Over 14' - 16' = F/R	
State Route 24	MP 0.00 (Junction SR 202 Loop) to MP 1.00 (Ellsworth Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 40 Spur	MP 0.03 (Beginning of route, West of Winslow) to MP 1.03 (End of route)	R17-6-403			Over 14' - 16' = F/R	
State Route 51	MP 0.00 Northbound McDowell Road Off Ramp (I-10 Overpass - Structure 2126)	R17-6-402; R17-6-403; R17-6-404	15' 2"		Over 14' - 16' = R	
State Route 51	MP 0.00 (Junction I-10 and SR 202 Loop) to MP 15.90 (Junction SR 101 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 61	MP 352.88 (Junction US 60) to MP 381.86 (Junction US 180)	R17-6-403			Over 12' - 16' = F/R	
State Route 61	MP 416.49 (Junction US 191) to MP 430.26 (New Mexico State Line)	R17-6-403			Over 10' - 16' = F/R	
State Route 64	MP 185.46 (Junction I-40 in Williams) to MP 237.10 (Grand Canyon National Park)	R17-6-403			Over 12' - 16' = F/R	
State Route 64	MP 267.10 (Grand Canyon National Park) to MP 295.83 (Junction US 89)	R17-6-403			Over 12' - 16' = F/R	
State Route 66	MP 56.70 (Junction I-40) to MP 123.10 (Route end)	R17-6-403			Over 14' - 16' = F/R	
State Route 67	MP 579.36 (Junction US 89A) to MP 610.26 (North Rim)	R17-6-403; Seasonal Road Closure			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Legal weight only, as provided under R17-6-102, Table 1. Over 80,000 requires class C permit.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 68	MP 1.10 (Junction SR 95) to MP 27.10 (Junction US 93)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 69	MP 262.20 (Junction I-17) to MP 296.00 (Junction SR 89)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 71	MP 86.10 (Junction US 60) to MP 102.90 (SR 71 Overpass)	R17-6-403			Over 12' - 16' = F/R	
State Route 71	MP 102.90 (SR 71 Overpass - Structure 842)	R17-6-403	14' 10"		Over 12' - 16' = F/R	
State Route 71	MP 102.90 (SR 71 Overpass) to MP 109.70 (Junction SR 89)	R17-6-403			Over 12' - 16' = F/R	
State Route 72	MP 13.10 (Junction SR 95) to MP 49.60 (Junction US 60)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 73	MP 310.40 (Junction US 60) to MP 334.72 (White River)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 73	MP 334.72 (White River) to MP 350.70 (Coal Mine Canyon)	R17-6-403			Over 14' - 16' = F/R	
State Route 73	MP 350.70 (Coal Mine Canyon Bridge - Structure 982)	R17-6-403			Over 14' - 16' = F/R	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
State Route 73	MP 350.70 (Coal Mine Canyon) to MP 357.72 (Junction SR 260)	R17-6-403			Over 14' - 16' = F/R	
State Route 74	MP 0.00 (Junction US 60) to MP 30.84 (Junction I-17)	R17-6-403			Over 14' - 16' = F/R	
State Route 75	MP 378.92 (Junction US 70) to MP 398.43 (Junction US 191)	R17-6-403			Over 14' - 16' = F/R	
State Route 77	MP 68.05 (Junction I-10 at W. Miracle Mile) to MP 69.54 (N. Oracle Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
State Route 77	MP 69.54 (N. Oracle Road) to MP 74.84 (Ina Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
State Route 77	MP 74.84 (Ina Road) to MP 81.82 (Junction SR 989 at Tangerine Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 77	MP 81.82 (Junction SR 989 at Tangerine Road) to MP 91.13 (Junction SR 79)	R17-6-403			Over 14' - 16' = F/R	
State Route 77	MP 91.13 (Junction SR 79) to MP 113.60 (Mammoth Town Limit)	R17-6-403			Over 14' - 16' = F/R	
State Route 77	MP 113.60 (Mammoth Town Limit) to MP 134.80 (Junction SR 177)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 77	MP 134.80 (Junction SR 177) to MP 170.90 (Junction US 70)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 77	MP 342.20 (Junction US 60, Show Low) to MP 361.05 (Junction SR 277)	R17-6-403			Over 12' - 16' = F/R	
State Route 77	MP 361.05 (Junction SR 277) to MP 386.20 (Junction SR 377)	R17-6-403			Over 12' - 16' = F/R	
State Route 77	MP 386.20 (Junction SR 377) to MP 387.81 (Junction US 180)	R17-6-403			Over 12' - 16' = F/R	
State Route 77	MP 387.81 (Junction US 180) to MP 388.67 (Junction SB 40, Holbrook)	R17-6-403			Over 12' - 16' = F/R	
State Route 77	MP 395.05 (I-40 East of Holbrook) to MP 408.93 (End of State Route at Navajo Nation boundary)	R17-6-403			Over 12' - 16' = F/R	
State Route 78	MP 154.55 (Junctions SR 75 and US 191) to MP 174.73 (New Mexico State Line)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 79	MP 91.14 (Junction SR 77) to MP 132.17 (Junction SB 79)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 79	MP 134.03 (Junction SB 79) to MP 150.28 (Junction US 60)	R17-6-403			Over 14' - 16' = F/R	
State Route 80	MP 293.27 (Junction SB 10 in Benson) to MP 339.06 (Mule Pass Tunnel)	R17-6-403			Over 14' - 16' = F/R	
State Route 80	MP 339.06 (Mule Pass Tunnel - Structure 538)	R17-6-403	14'		Over 14' - 16' = F/R	
State Route 80	MP 339.06 (Mule Pass Tunnel) to MP 343.01 (Lowell Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Route 80	MP 343.01 (Lowell Underpass - Structure 269)	R17-6-403	14' 7"		Over 14' - 16' = F/R	
State Route 80	MP 343.01 (Lowell Underpass) to MP 348.15 (Mule Pass - Lowell Arch)	R17-6-403			Over 14' - 16' = F/R	



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 80	MP 348.15 (Mule Pass - Lowell Arch - Structure 130)	R17-6-403			Over 14' - 16' = F/R	Legal weight only, as provided under R17-6-102, Table 1.
State Route 80	MP 348.15 (Mule Pass - Lowell Arch) to MP 352.38 (Glance Creek Bridge)	R17-6-403			Over 14' - 16' = F/R	
State Route 80	MP 352.38 (Glance Creek Bridge - Structure 237)	R17-6-403			Over 14' - 16' = F/R	Legal weight only, as provided under R17-6-102, Table 1.
State Route 80	MP 352.38 (Glance Creek Bridge) to MP 364.66 (Douglas)	R17-6-403			Over 14' - 16' = F/R	
State Route 80	MP 364.66 (Douglas) to MP 366.12 (Junction US 191)	R17-6-403			Over 12' - 16' = F/R	
State Route 80	MP 366.12 (Junction US 191) to MP 415.39 (New Mexico State Line)	R17-6-403			Over 12' - 16' = F/R	
State Route 82	MP 0.00 (Junction SB 19) to MP 32.36 (Junction SR 83)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 82	MP 32.36 (Junction SR 83) to MP 51.59 (Junction SR 90)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 82	MP 51.59 (Junction SR 90) to MP 61.20 (San Pedro River)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 82	MP 61.20 (San Pedro River Bridge - Structure 403)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
State Route 82	MP 61.20 (San Pedro River) to MP 67.57 (Junction SR 80)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 83	MP 3.19 (Parker Canyon Lake) to MP 31.63 (Junction SR 82)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 83	MP 31.63 (Junction SR 82) to MP 58.00 (Junction I-10)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 84	MP 155.13 (Junction I-8) to MP 177.60 (Railroad Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Route 84	MP 177.66 Eastbound (Railroad Underpass - Structure 143)	R17-6-403	13' 3"		Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 84	MP 177.66 Westbound (Railroad Underpass - Structure 1062)	R17-6-403	14'		Over 14' - 16' = F/R	
State Route 84	MP 177.60 (Railroad Underpass) to MP 177.97 (Junctions SR 387 and SR 287)	R17-6-403			Over 14' - 16' = F/R	
State Route 85	MP 0.00 (Junction SB 8) to MP 0.35 (I-8 Under- pass)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.35 (I-8 Underpass - Structure 702)	R17-6-403	14' 5"		Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.35 (I-8 Under- pass) to MP 0.37 (Rail- road Underpass)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.37 (Railroad Underpass - Structure 734)	R17-6-403	14' 5"		Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.37 (Railroad Underpass) to MP 0.60 (I-8 Overpass)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.60 (I-8 Overpass WB/EB - Structures 1557 & 1558)	R17-6-403	14' 11"		Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 0.60 (I-8 Overpass) to MP 39.70 (Town of Ajo)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 39.70 (Town of Ajo) to MP 80.69 (US/Mex- ico Border)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 85	MP 120.31 (Junction SB 8) to MP 154.48 (Junc- tion I-10)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 86	MP 53.00 (Junction SR 85) to MP 150.42 (Junc- tion SR 286)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 86	MP 150.42 (Junction SR 286) to MP 164.04 (Camino Verde Road)	R17-6-403			Over 14' - 16' = F/R	
State Route 86	MP 164.04 (Camino Verde Road) to MP 171.44 (Junction I-19)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
State Route 87	MP 115.20 (Junction I- 10) to MP 115.77 (Junc- tion SR 84 at Milligan Road)	R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 115.77 (Junction SR 84 at Milligan Road) to MP 125.81 (Junction SR 287)	R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 125.81 (Junction SR 287) to MP 141.47 (Junction SR 387)	R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 141.47 (Junction SR 387) to MP 146.04 (Junction SR 187)	R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 146.04 (Junction SR 187 to MP 159.62 (Hunt Highway, Junction SR 587)	R17-6-403			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 87	MP 159.62 (Hunt Highway, Junction SR 587) to MP 162.67 (Ocotillo Road, Chandler)	R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 162.67 (Ocotillo Road, Chandler) to MP 165.36 (Junction SR 202 Loop)	Local Requirements			Local Requirements	City of Chandler Jurisdiction.
State Route 87	MP 165.36 (Junction SR 202 Loop) to MP 170.20 (Western Canal Crossing)	Local Requirements			Local Requirements	City of Chandler Jurisdiction.
State Route 87	MP 170.20 (Western Canal Crossing) to MP 172.50 (Junction US 60)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 172.50 (Junction US 60) to MP 176.74 (Junction SR 202 Loop)	Local Requirements			Local Requirements	City of Mesa Jurisdiction.
State Route 87	MP 176.74 (Junction SR 202 Loop Overpass - Structure 2491)	R17-6-402; R17-6-403	15' 8"		Over 14' - 16' = F/R	
State Route 87	MP 176.74 (Junction SR 202 Loop) to MP 252.50 (Junction SR 260, Payson)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 87	MP 252.50 (Junction SR 260, Payson) to MP 278.80 (Junction SR 260)	R17-6-402; R17-6-407		40'+ requires F/R + 2 LE	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 87	MP 278.80 (Junction SR 260) to MP 340.94 (Junction SR 99)	R17-6-403; R17-6-407			Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 87	MP 340.94 (Junction SR 99) to MP 342.10 (Railroad Underpass, Winslow)	R17-6-403; R17-6-407			Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 87	MP 342.10 (Railroad Underpass, Winslow - Structure 194)	R17-6-403; R17-6-407	14' 6"		Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 87	MP 342.10 (Railroad Underpass, Winslow) to MP 342.23 (Junction SB 40, 3rd Street in Winslow)	R17-6-403; R17-6-407			Over 12' - 14' = F/R Over 14' - 16' = F/R + 3 LE	
State Route 87	MP 343.56 (Junction SB 40, Transcon Lane in Winslow) to MP 345.52 (Junction I-40)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R	
State Route 87	MP 345.52 (Junction I-40) to MP 406.04 (Junction SR 264)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 88	MP 193.85 (Junction US 60) to MP 202.84 (Apache Trail Marker)	R17-6-403			Over 14' - 16' = F/R	
State Route 88	MP 202.84 (Apache Trail Marker) to MP 209.62 (First Water Creek Bridge)	R17-6-402		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 88	MP 209.62 (First Water Creek Bridge - Structure 26)	R17-6-403	14' 0"	Over 40' requires class C permit	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 88	MP 209.62 (First Water Creek Bridge) to MP 211.05 (Boulder Canyon Bridge)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 88	MP 211.05 (Boulder Canyon Bridge - Structure 193)	R17-6-403	14'	Over 40' requires class C permit	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1.
State Route 88	MP 211.05 (Boulder Canyon Bridge) to MP 220.20 (End of pavement)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 88	MP 220.20 (End of pavement) to MP 222.00 (Fish Creek Hill)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 222.00 (Fish Creek Hill) to MP 223.50 (Fish Creek Bridge)	R17-6-403; One lane road		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 223.50 (Fish Creek Bridge - Structure 27)	R17-6-403; One lane bridge		No trucks over 40'	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1. Over 20,000 requires class C permit.
State Route 88	MP 223.50 (Fish Creek Bridge) to MP 224.40 (End of one lane road)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 224.40 (End of one lane road) to MP 224.60 (Lewis and Pranty Creek Bridge)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 224.60 (Lewis and Pranty Creek Bridge - Structure 28)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1. Over 20,000 requires class C permit.
State Route 88	MP 224.60 (Lewis and Pranty Creek Bridge) to MP 225.55 (Dry Wash Bridge)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 225.55 (Dry Wash Bridge - Structure 15)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1. Over 20,000 requires class C permit.
State Route 88	MP 225.55 (Dry Wash Bridge) to MP 226.60 (ADOT Maintenance Yard)	R17-6-403		No trucks over 40'	Over 8' 6" requires class C permit	Over 20,000 requires class C permit.
State Route 88	MP 226.60 (ADOT Maintenance Yard) to MP 233.50 (Pine Creek Bridge)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 88	MP 233.50 (Pine Creek Bridge - Structure 31)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1.
State Route 88	MP 233.50 (Pine Creek Bridge) to MP 240.57 (Begin Pavement)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 88	MP 240.57 (Begin Pavement) to MP 242.40 (Junction SR 188)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 89	MP 258.20 (Junction US 93) to MP 271.91 (Divided Highway)	R17-6-403			Over 12' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 89	MP 271.91 Northbound (Begin Divided Highway) to MP 275.62 (End Divided Highway)	R17-6-403			Over 12' - 16' = F/R	
State Route 89	MP 271.91 Southbound (End Divided Highway) to MP 275.62 (Begin Divided Highway)	R17-6-403		Over 40' requires class C permit	Over 12' - 16' = F/R	
State Route 89	MP 275.62 (End Divided Highway) to MP 295.00 (Wilhoit Community Limit)	R17-6-403			Over 12' - 16' = F/R	
State Route 89	MP 295.00 (Wilhoit Community Limit) to MP 309.00 (Prescott City Limit)	R17-6-403		Over 40' requires class C permit	Over 8' requires class C permit	
State Route 89	MP 309.00 (Prescott City Limit) to MP 309.45 (Granite Creek Bridge #2)	R17-6-403			Over 12' - 16' = F/R + 2 LE	
State Route 89	MP 309.45 (Granite Creek Bridge #2 - Structure 106)	R17-6-403			Over 12' - 16' = F/R + 2 LE	Legal weight only, as provided under R17-6-102, Table 1.
State Route 89	MP 309.45 (Granite Creek Bridge #2) to MP 320.00 (Willow Creek Road)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	City of Prescott Jurisdiction: MP 310.26 to MP 319.00 & MP 312.57 to MP 313.99.
State Route 89	MP 320.00 (Willow Creek Road) to MP 363.00 (Junction I-40)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 89A	MP 317.80 (Junction SR 89) to MP 330.10 (Old Fain Road)	R17-6-403			Over 14' - 16' = F/R	
State Route 89A	MP 330.10 (Old Fain Road) to MP 348.00 (Clarkdale)	R17-6-403		Over 50' requires class C permit	Over 8' requires class C permit	
State Route 89A	MP 348.00 (Clarkdale) to MP 355.21 (Junction SR 260)	R17-6-403			Over 14' - 16' = F/R	
State Route 89A	MP 355.21 (Junction SR 260) to MP 374.14 (Junction SR 179)	R17-6-403			Over 14' - 16' = F/R	
State Route 89A	MP 374.14 (Junction SR 179) to MP 375.66 (Midgley/Wilson Canyon Bridge)	R17-6-403		Over 50' requires class C permit	Over 10' - 12' = F/R Over 12' - 16' = F/R + 2 LE	
State Route 89A	MP 375.66 (Midgley/Wilson Canyon Bridge - Structure 232)	R17-6-403		Over 50' requires class C permit	Over 10' - 12' = F/R Over 12' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 89A	MP 375.66 (Midgley/Wilson Canyon Bridge) to MP 390.18 (Oak Creek Vista)	R17-6-403		Over 50' requires class C permit	Over 10' - 12' = F/R Over 12' - 16' = F/R + 2 LE	
State Route 89A	MP 390.18 (Oak Creek Vista) to MP 398.96 (JW Powell Boulevard/I-17)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 89A Spur	MP 324.47 (Junction SR 89A) to MP 331.63 (Junction SR 69)	R17-6-403			Over 14' - 16' = F/R	
State Route 90	MP 289.59 (Junction I-10) to MP 336.40 (Junction SR 80)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 90 Spur	MP 316.88 (Junction SR 90) to MP 317.29 (Buffalo Soldier Trail)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 92	MP 321.00 (Junction SR 90) to MP 355.00 (Junction SR 80)	R17-6-403			Over 14' - 16' = F/R	
State Route 95	MP 109.10 (Main Street in Quartzsite) to MP 131.68 (Junction SR 72)	R17-6-403			Over 14' - 16' = F/R	
State Route 95	MP 131.68 (Junction SR 72) to MP 143.93 (Junction SR 95 Spur)	R17-6-403			Over 12' - 16' = F/R	
State Route 95	MP 143.93 (Junction SR 95 Spur) to MP 144.75 (Airport Road in Parker)	R17-6-403			Over 14' - 16' = F/R	
State Route 95	MP 144.75 (Airport Road in Parker) to MP 187.51 (Chenoweth Drive in Lake Havasu City)	R17-6-403			Over 14' - 16' = F/R	
State Route 95	MP 187.51 (Chenoweth Drive in Lake Havasu City) to MP 202.06 (Junction I-40)	R17-6-403			Over 14' - 16' = F/R	
State Route 95	MP 226.08 (California State Line near Needles) to MP 227.32 (Courtwright Road)	R17-6-403			Over 12' - 16' = F/R	
State Route 95	MP 227.32 (Courtwright Road) to MP 249.80 (Junction SR 68)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 95A	MP 143.93 (Junction SR 95) to MP 144.85 (California State Line near Parker)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 96	MP 0.00 (Bagdad, Town Limit) to MP 4.01 (Junction SR 97)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 96	MP 4.01 (Junction SR 97) to MP 10.80 (Santa Maria River Bridge)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 96	MP 10.80 (Santa Maria River Bridge - Structure 225)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.
State Route 96	MP 10.80 (Santa Maria River Bridge) to MP 21.92 (Hillside Town Limit)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 97	MP 155.52 (Junction US 93) to MP 166.97 (Junction SR 96)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 98	MP 294.67 (Junction US 89) to MP 361.56 (Junction US 160)	R17-6-403			Over 14' - 16' = F/R	
State Route 99	MP 27.5 (Beginning of route South of Winslow) to MP 38.19 (Clear Creek Arch Bridge)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 99	MP 38.19 (Clear Creek Arch Bridge - Structure 1038)	R17-6-403			Over 14' - 16' = F/R + 2 LE	Legal weight only, as provided under R17-6-102, Table 1.
State Route 99	MP 38.19 (Clear Creek Arch Bridge) to MP 38.90 (Jacks Canyon Bridge)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 99	MP 38.90 (Jacks Canyon Bridge - Structure 1036)	R17-6-403			Over 14' - 16' = F/R + 2 LE	Legal weight only, as provided under R17-6-102, Table 1.
State Route 99	MP 38.90 (Jacks Canyon Bridge) to MP 42.65 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 99	MP 52.69 (Junction I-40) to MP 72.16 (Route end at BIA 15)	R17-6-403			Over 14' - 16' = F/R + 2 LE	
State Route 101 Loop	MP 1.21 (Junction I-10, near 99th Avenue) to MP 17.24 (75th Avenue TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 101 Loop	MP 17.24 Westbound (75th Avenue Overpass) - Structure 2051	R17-6-402; R17-6-403; R17-6-404	15' 4"		Over 14' - 16' = R	
State Route 101 Loop	MP 17.24 (75th Avenue TI) to MP 61.33 (Junction SR 202 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 143	MP 0.00 (Junction I-10) to MP 3.81 (McDowell Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 169	MP 0.00 (Junction SR 69) to MP 15.10 (Junction I-17)	R17-6-403			Over 14' - 16' = F/R	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 177	MP 136.31 (Junction SR 77) to MP 167.64 (Junction US 60)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 179	MP 298.95 (Junction I-17 Overpass - Structures 633 & 1061)	R17-6-402	14' 2"		Over 12' - 16' = F/R	
State Route 179	MP 298.95 (Junction I-17 Overpass) to MP 313.44 (Junction SR 89A)	R17-6-403			Over 12' - 16' = F/R	
State Route 180A	MP 343.10 (Junction US 180) to MP 353.00 (Junction SR 61)	R17-6-403			Over 14' requires class C permit	
State Route 181	MP 38.25 (Junction US 191) to MP 61.08 (Junction SR 186)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 181	MP 61.08 (Junction SR 186) to MP 65.04 (Chiricahua National Monument)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 186	MP 326.19 (Junction I-10 in Willcox) to MP 327.49 (Junction SB 10 in Willcox)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R	
State Route 186	MP 328.20 (Junction SB 10 in Willcox) to MP 359.42 (Junction SR 181)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 187	MP 186.77 (Junction SR 387) to MP 192.19 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R	
State Route 188	MP 214.92 (Junction US 60) to MP 229.58 (Junction SR 288)	R17-6-403			Over 14' - 16' = F/R	
State Route 188	MP 229.58 (Junction SR 288) to MP 244.15 (Junction SR 88)	R17-6-403			Over 14' - 16' = F/R	
State Route 188	MP 244.15 (Junction SR 88) to MP 244.28 (Roosevelt Lake Bridge)	R17-6-403			Over 14' - 16' = F/R	
State Route 188	MP 244.28 (Roosevelt Lake Bridge - Structure 2028)	R17-6-403			Over 14' - 16' = F/R	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
State Route 188	MP 244.28 (Roosevelt Lake Bridge) to MP 250.00 (Rock Creek)	R17-6-403			Over 14' - 16' = F/R	



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 188	MP 250.00 (Rock Creek) to MP 260.00 (South of Punkin Center)	R17-6-403			Over 14' - 16' = F/R	
State Route 188	MP 260.00 (South of Punkin Center) to MP 276.78 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R	
State Route 189	MP 0.00 (US/Mexico Border) to MP 2.88 (Junction I-19)	R17-6-403			Over 14' - 16' = F/R	
State Route 189	MP 2.88 (Junction I-19) to MP 3.75 (Junction SB 19)	R17-6-403			Over 14' - 16' = F/R	
State Route 195	MP 5.50 (Begin route at Avenue E) to MP 27.30 (Union Pacific Railroad Underpass)	R17-6-403			Over 14' - 16' = F/R	
State Route 195	MP 27.30 (Union Pacific Railroad Underpass - Structure 2964)	R17-6-403	15' 4"		Over 14' - 16' = F/R	
State Route 195	MP 27.30 (Union Pacific Railroad Underpass) to MP 27.44 (Junction I-8 Eastbound Ramp)	R17-6-403			Over 14' - 16' = F/R	
State Route 195	MP 27.44 (I-8 Eastbound Underpass - Structure 1277)	R17-6-403	15' 4"		Over 14' - 16' = F/R	
State Route 195	MP 27.47 (I-8 Westbound Underpass - Structure 1278)	R17-6-403	15' 4"		Over 14' - 16' = F/R	
State Route 195	MP 27.47 (I-8 Westbound Underpass) to MP 27.61 (Junction I-8 Westbound Ramp)	R17-6-403			Over 14' - 16' = F/R	
State Route 202 Loop	MP 0.00 (Junction I-10 and SR 51) to MP 9.80 (Junction SR 101 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 202 Loop	MP 9.80 (Junction SR 101 Loop) to MP 55.50 (Junction I-10, Santan TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 202 Loop	MP 55.50 (Junction I-10, Santan TI) to MP 77.80 (Junction I-10, West Phoenix TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 202 Spur	MP 5.15 (Junction SR 202 Loop) to MP 6.28 (Sky Harbor Blvd TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
State Route 210	MP 1.00 (Broadway Blvd) to MP 4.78 (Richey Blvd)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
State Route 238	MP 24.00 to MP 44.25 (Junction SR 347)	R17-6-403			Over 14' - 16' = F/R	
State Route 260	MP 206.40 (Junction SR 89A) to MP 218.60 (Junction I-17)	R17-6-403			Over 14' - 16' = F/R	
State Route 260	MP 218.60 (Junction I-17) to MP 252.00 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 260	MP 252.00 (Junction SR 87 in Payson) to MP 256.00 (Star Valley)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 260	MP 256.00 (Star Valley) to MP 305.67 (Junction SR 277)	R17-6-403; R17-6-407			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 260	MP 305.67 (Junction SR 277) to MP 340.07 (Junction US 60 in Show Low)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 260	MP 341.68 (Junction US 60 in East Show Low) to MP 357.72 (Junction SR 73)	R17-6-403			Over 14' - 16' = F/R	
State Route 260	MP 357.72 (Junction SR 73) to MP 368.60 (Junction SR 473, Hawley Lake Road)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 260	MP 368.60 (Junction SR 473, Hawley Lake Road) to MP 377.44 (Junction SR 273)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 260	MP 377.44 (Junction SR 273) to MP 385.56 (Junction SR 373, Greer)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 260	MP 385.56 (Junction SR 373, Greer) to MP 393.01 (Junction SR 261, Big Lake)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 260	MP 393.01 (Junction SR 261, Big Lake) to MP 398.67 (Junction US 180)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 261	MP 394.37 (Junction SR 273) to MP 412.50 (Junction SR 260)	R17-6-403; Seasonal Road Closure			Over 8' 6" requires class C permit	
State Route 264	MP 321.97 (Junction US 160) to MP 384.23 (Junction SR 87)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 264	MP 384.23 (Junction SR 87) to MP 441.02 (Junction US 191)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 264	MP 441.02 (Junction US 191) to MP 446.87 (Junction US 191)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R	
State Route 264	MP 446.87 (Junction US 191) to MP 476.12 (New Mexico State Line)	R17-6-403			Over 12' - 16' = F/R	
State Route 266	MP 104.60 (Junction US 191) to MP 123.14 (Junction SR 266 Spur in Bonita)	R17-6-403			Over 12' - 16' = F/R	
State Route 266	MP 123.14 (Junction SR 266 Spur in Bonita) to MP 123.80 (Fort Grant Road in Bonita)	R17-6-403			Over 12' - 16' = F/R	
State Route 266 Spur	MP 123.14 (Junction SR 266 in Bonita) to MP 126.17 (Fort Grant)	R17-6-403			Over 12' - 16' = F/R	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 273	MP 377.46 (Junction SR 260) to MP 396.83 (Big Lake Turnoff)	R17-6-403; Seasonal Road Closure			Over 14' - 16' = F/R	
State Route 277	MP 305.67 (Junction SR 260) to MP 312.62 (Junction SR 377)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 277	MP 312.62 (Junction SR 377) to MP 321.20 (Junction SR 277 Spur)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 277	MP 321.20 (Junction SR 277 Spur) to MP 336.45 (Junction SR 77)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 277 Spur	MP 321.18 (Junction SR 277, West of Snowflake) to MP 322.40 (Old Paper Mill)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 286	MP 0.00 (US/Mexico Border) to MP 45.48 (Junction SR 86)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 287	MP 111.72 (Junction SR 387) to MP 115.84 (Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
State Route 287	MP 115.84 (Junction I-10) to MP 125.81 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R	
State Route 287	MP 134.75 (Junction SR 87) to MP 142.96 (Junction SB 79)	R17-6-403			Over 14' - 16' = F/R	
State Route 288	MP 258.10 (Junction SR 188) to MP 262.44 (Salt River Bridge)	R17-6-403		70'+ requires F/R	Over 8' 6" requires class C permit	
State Route 288	MP 262.44 (Salt River Bridge - Structure 37)	R17-6-403	12'	70'+ requires F/R	Over 8' 6" requires class C permit	Legal weight only, as provided under R17-6-102, Table 1.
State Route 288	MP 262.44 (Salt River Bridge) to MP 311.90 (Route end near Young)	R17-6-403		70'+ requires F/R	Over 8' 6" requires class C permit	
State Route 289	MP 0.00 (Junction I-19) to MP 10.83 (Route end)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 303 Loop	MP 103.87 (Junction I-10) to MP 119.28 (Junction US 60, Grand Avenue)	R17-6-403			Over 14' - 16' = R	
State Route 303 Loop	MP 119.28 (Junction US 60, Grand Avenue) to MP 139.14 (Junction I-17 - Sonoran Desert Drive TI)	R17-6-403			Over 14' - 16' = R	
State Route 303 Loop	MP 139.16 Northbound (I-17 South Underpass - Structure 2876)	R17-6-403	15' 7"		Over 14' - 16' = R	
State Route 303 Loop	MP 139.18 Southbound (I-17 North Underpass - Structure 2875)	R17-6-403	15' 10"		Over 14' - 16' = R	
State Route 303 Loop	MP 139.20 (Junction I-17 - Sonoran Desert Drive TI) to MP 139.29 (End of Route East of Junction I-17)	R17-6-403			Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
State Route 347	MP 160.89 (Junction SR 84) to MP 174.55 (Junction SR 238)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 347	MP 174.55 (Junction SR 238) to MP 189.31 (Junction I-10)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
State Route 366	MP 113.69 (Junction US 191) to MP 118.60 (Coronado National Forest Marker)	R17-6-403			Over 12' - 14' = F/R	
State Route 366	MP 118.60 (Coronado National Forest Marker) to MP 143.20 (Route end)	R17-6-403; Seasonal Road Closure		Over 40' requires class C permit	Over 8' 6" requires class C permit	
State Route 373	MP 385.65 (Junction SR 260) to MP 390.21 (End of route at Greer)	R17-6-403		80'+ requires F/R	Over 12' - 16' = F/R	
State Route 377	MP 0.00 (Junction SR 277) to MP 33.83 (Junction SR 77)	R17-6-403			Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 386	MP 0.00 (Junction SR 86) to MP 12.05 (Kitt Peak National Observatory)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
State Route 387	MP 0.00 (Junctions SR 84 and SR 287) to MP 8.42 (Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
State Route 387	MP 8.42 (Junction I-10) to MP 15.72 (Junction SR 87)	R17-6-403			Over 14' - 16' = F/R	
State Route 389	MP 0.00 (Utah State Line) to MP 32.60 (Junction US 89A)	R17-6-403			Over 14' - 16' = F/R	
State Route 473	MP 0.00 (Junction SR 260) to MP 10.03 (Route end at Hawley Lake)	R17-6-403; Seasonal Road Closure		60'+ requires F/R	Over 10' - 14' = F/R Over 14' requires class C permit	20,000
State Route 564	MP 374.28 (Junction US 160) to MP 383.46 (Route end)	R17-6-403			Over 12' - 14' = F/R Over 14' requires class C permit	
State Route 587	MP 218.76 (Junction SR 87) to MP 225.30 (Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
State Route 989	MP 34.01 (N. Rancho Vistoso Blvd/N. 1st Avenue) to MP 36.00 (Junction SR 77 at N. Oracle Road)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
U.S. Highway 60	MP 31.20 (Junction I-10) to MP 49.52 (Junction SR 72)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 49.52 (Junction SR 72) to MP 85.91 (Junction SR 71)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 85.91 (Junction SR 71) to MP 107.7 (Vulture Mine Road)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 107.7 (Vulture Mine Road) to MP 110.24 (Washington Street)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 60	MP 110.24 Eastbound (Washington Street Underpass, Wickenburg - Structure 535)	R17-6-402; R17-6-403	13' 10"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.24 Westbound (Washington Street Underpass, Wickenburg - Structure 535)	R17-6-402; R17-6-403	13' 9"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.25 Eastbound (Railroad Underpass, Wickenburg - Structure 195)	R17-6-402; R17-6-403	13' 10"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.25 Westbound (Railroad Underpass, Wickenburg - Structure 195)	R17-6-402; R17-6-403	13' 9"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.26 Eastbound (Frontier Street Underpass, Wickenburg - Structure 1000)	R17-6-402; R17-6-403	13' 10"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.26 Westbound (Frontier Street Underpass, Wickenburg - Structure 1000)	R17-6-402; R17-6-403	13' 9"		Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.26 (Frontier Street) to MP 110.33 (Junction US 93)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 110.33 (Junction US 93) to MP 138.48 (Junction SR 303 Loop)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 138.48 (Junction SR 303 Loop) to MP 148.90 (Junction SR 101 Loop)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 148.90 (Junction SR 101 Loop) to MP 160.10 (Junction I-17)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = F/R	
U.S. Highway 60	MP 172.00 (Junction I-10) to MP 172.90 (Hardy Drive)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 172.90 Eastbound (Hardy Drive Underpass - Structure 1376)	R17-6-402; R17-6-403; R17-6-404	15' 7"		Over 14' - 16' = R	
U.S. Highway 60	MP 172.90 Westbound (Hardy Drive Underpass - Structure 1376)	R17-6-402; R17-6-403; R17-6-404	15' 3"		Over 14' - 16' = R	
U.S. Highway 60	MP 172.90 (Hardy Drive) to MP 174.41 (Rural Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 174.41 Eastbound (Rural Road Underpass - Structure 1660)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
U.S. Highway 60	MP 174.41 (Rural Road TI) to MP 175.42 (McClintock Drive)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 175.42 Eastbound (McClintock Drive Underpass - Structure 1661)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
U.S. Highway 60	MP 175.42 Westbound (McClintock Drive Underpass - Structure 1661)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 60	MP 175.42 (McClin-tock Drive) to MP 176.29 (Junction SR 101 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 176.29 (Junction SR 101 Loop) to MP 177.45 (Dobson Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 177.45 (Dobson Road Underpass - Structure 1795)	R17-6-402; R17-6-403; R17-6-404	15' 9"		Over 14' - 16' = R	
U.S. Highway 60	MP 177.45 (Dobson Road TI) to MP 184.39 (Val Vista Drive TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 184.39 (Val Vista Drive Underpass - Structure 1883)	R17-6-402; R17-6-403; R17-6-404	15' 10"		Over 14' - 16' = R	
U.S. Highway 60	MP 184.39 (Val Vista Drive TI) to MP 184.77 (39th Street)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 184.77 (39th Street Underpass - Structure 1918)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
U.S. Highway 60	MP 184.77 (39th Street) to MP 186.34 (Higley Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 186.34 (Higley Road Underpass - Structure 1922)	R17-6-402; R17-6-403; R17-6-404	15' 11"		Over 14' - 16' = R	
U.S. Highway 60	MP 186.34 (Higley Road TI) to MP 188.38 (Power Road TI)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 188.38 (Power Road Underpass - Structure 1924)	R17-6-402; R17-6-403; R17-6-404	15' 9"		Over 14' - 16' = R	
U.S. Highway 60	MP 188.38 (Power Road TI) to MP 190.51 (Junction SR 202 Loop)	R17-6-402; R17-6-403; R17-6-404			Over 14' - 16' = R	
U.S. Highway 60	MP 190.51 (Junction SR 202 Loop) to MP 194.38 (Meridian Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
U.S. Highway 60	MP 194.38 (Meridian Road Underpass - Structure 1438)	R17-6-402; R17-6-403	15' 9"		Over 14' - 16' = R	
U.S. Highway 60	MP 194.38 (Meridian Road) to MP 196.14 (Junction SR 88, Idaho Road)	R17-6-402; R17-6-403			Over 14' - 16' = R	
U.S. Highway 60	MP 196.14 (Junction SR 88, Idaho Road) to MP 212.17 (Junction SR 79)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 60	MP 212.17 (Junction SR 79) to MP 226.87 (Junction SR 177)	R17-6-402; R17-6-403; R17-6-407			Over 14' - 16' = F/R	
U.S. Highway 60	MP 226.87 (Junction SR 177) to MP 227.71 (Queen Creek Bridge)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 60	MP 227.71 (Queen Creek Bridge - Structure 406)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.
U.S. Highway 60	MP 227.71 (Queen Creek Bridge) to MP 228.47 (Queen Creek Tunnel)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 60	MP 228.47 (Queen Creek Tunnel - Structure 407)	R17-6-403; R17-6-407	14' *	80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R + 2 LE	* Over 14' to 16' in height requires F/R + 2 LE: Coordinate road closures by or under the direction of law enforcement escorts; and Drive in center of tunnel.
U.S. Highway 60	MP 228.47 (Queen Creek Tunnel) to MP 238.25 (Pinto Creek Bridge)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 60	MP 238.25 (Pinto Creek Bridge - Structure 351)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.
U.S. Highway 60	MP 238.25 (Pinto Creek Bridge) to MP 247.04 (Junction SR 188)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 60	MP 247.04 (Junction SR 188) to MP 252.06 (Junction US 70)	R17-6-403; R17-6-407		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 11' - 14' = F/R Over 14' - 16' = F/R	
U.S. Highway 60	MP 252.06 (Junction US 70) to MP 292.91 (Apache Bridge)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' Prohibited	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 60	MP 292.91 (Apache Bridge - Structure 1929)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' Prohibited	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
U.S. Highway 60	MP 292.91 (Apache Bridge) to MP 318.14 (Junction SR 73)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' Prohibited	
U.S. Highway 60	MP 318.14 (Junction SR 73) to MP 323.44 (Cedar Canyon Bridge)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 60	MP 323.44 (Cedar Canyon Bridge - Structure 215)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.
U.S. Highway 60	MP 323.44 (Cedar Canyon Bridge) to MP 338.86 (Summit Trail)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 60	MP 338.86 (Summit Trail) to MP 339.71 (Junction SR 260)	R17-6-403		80'+ non-articulated requires F/R; 110'+ articulated requires F/R	Over 12' - 16' = F/R	
U.S. Highway 60	MP 339.71 (Junction SR 260) to MP 341.69 (Junction SR 260)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 60	MP 341.69 (Junction SR 260) to MP 342.77 (Junction SR 77)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 60	MP 342.77 (Junction SR 77) to MP 353.16 (Junction SR 61)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 60	MP 353.16 (Junction SR 61) to MP 371.74 (Malloy Draw)	R17-6-403			Over 12' - 16' = F/R	



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 60	MP 371.74 (Mallory Draw Bridge - Structure 2605)	R17-6-403			Over 12' - 16' = F/R	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
U.S. Highway 60	MP 371.74 (Mallory Draw) to MP 384.45 (Junction US 180)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 60	MP 384.45 (Junction US 180) to MP 401.97 (New Mexico State Line)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 64	MP 465.40 (Junction US 160) to MP 469.54 (New Mexico State Line)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 252.14 (Junction US 60) to MP 253.63 (Railroad Underpass)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 253.63 (Railroad Underpass - Structure 562)	R17-6-403	15' 6"		Over 14' - 16' = F/R	
U.S. Highway 70	MP 253.63 (Railroad Underpass) to MP 254.11 (Junction SR 77)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 254.11 (Junction SR 77) to MP 339.45 (Junction US 191)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 339.45 (Junction US 191) to MP 349.48 (Junction US 191)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 349.48 (Junction US 191) to MP 378.90 (Junction SR 75)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 70	MP 378.90 (Junction SR 75) to MP 385.25 (New Mexico State Line)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89	MP 401.00 (Junction I-40) to MP 420.38 (Junction SB 40)	R17-6-403			Local Requirements	City of Flagstaff Jurisdiction
U.S. Highway 89	MP 420.38 (Junction SB 40) to MP 465.21 (Junction SR 64)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89	MP 465.21 (Junction SR 64) to MP 480.80 (Junction US 160)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89	MP 480.80 (Junction US 160) to MP 524.01 (Junction US 89A)	R17-6-403			Over 14' - 16' = F/R	

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 89	MP 524.01 (Junction US 89A) to MP 546.20 (Junction SR 98)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89	MP 546.20 (Junction SR 98) to MP 549.54 (Glen Canyon Bridge)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89	MP 549.54 (Glen Canyon Bridge - Structure 537)	R17-6-403			Over 14' - 16' = F/R	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
U.S. Highway 89	MP 549.54 (Glen Canyon Bridge) to MP 556.99 (Utah State Line)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 89A	MP 524.07 (Junction US 89) to MP 537.86 (Navajo Bridge at Colorado River)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 89A	MP 537.86 (Navajo Bridge at Colorado River - Structure 2340)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
U.S. Highway 89A	MP 537.86 (Navajo Bridge at Colorado River) to MP 547.00 (Cliff Dweller's Lodge)	R17-6-403			Over 10' - 14' = F/R Over 14' - 16' = F/R + 2 LE	
U.S. Highway 89A	MP 547.00 (Cliff Dweller's Lodge) to MP 579.30 (Junction SR 67)	R17-6-403			Over 8' 6" requires class C permit	
U.S. Highway 89A	MP 579.30 (Junction SR 67) to MP 609.23 (Junction SR 389)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 89A	MP 609.23 (Junction SR 389) to MP 613.03 (Utah State Line)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 93	MP 0.00 (Hoover Dam Bypass) to MP 67.20 (Junction SR 68)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	Nevada issues permit for Mike O'Callaghan - Pat Tillman Memorial Bridge (Colorado River Bridge).

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 93	MP 67.20 (Junction SR 68) to MP 71.10 (Junction I-40, Exit # 48)	R17-6-402; R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 93	MP 91.38 (Junction I-40, Exit # 71) to MP 139.07 Southbound (Burro Creek Bridge)	R17-6-403; R17-6-407			Over 14' - 16' = F/R + 2 LE	
U.S. Highway 93	MP 139.07 Southbound (Burro Creek Bridge - Structure 846)	R17-6-403; R17-6-407			Over 14' - 16' = F/R + 2 LE	Class A permitted vehicles with a gross weight of: 150,000 or less - no additional restrictions; 150,001 through 250,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. Class C permitted vehicles with a gross weight of: 250,001 or more require special analysis and approval from the ADOT Bridge Group.
U.S. Highway 93	MP 139.07 Southbound (Burro Creek Bridge) to MP 154.85 (Junction SR 97)	R17-6-403; R17-6-407			Over 14' - 16' = F/R + 2 LE	
U.S. Highway 93	MP 154.85 (Junction SR 97) to MP 182.90 (Junction SR 71)	R17-6-403; R17-6-407			Over 14' - 16' = F/R + 2 LE	
U.S. Highway 93	MP 182.90 (Junction SR 71) to MP 193.61 (Junction SR 89)	R17-6-403; R17-6-407			Over 14' - 16' = F/R + 2 LE	
U.S. Highway 93	MP 193.61 (Junction SR 89) to MP 199.67 (Junction US 60 in Wickenburg)	R17-6-403; R17-6-407			Over 14' - 16' = F/R	
U.S. Highway 95	MP 29.34 (Araby Road) to MP 104.25 (Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 95	MP 104.25 (Junction I-10) to MP 104.51 (Main Street in Quartzsite)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 311.46 (Junction US 89) to MP 321.86 (Junction SR 264)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 321.86 (Junction SR 264) to MP 361.61 (Junction SR 98)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 361.61 (Junction SR 98) to MP 374.28 (Junction SR 564)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 374.28 (Junction SR 564) to MP 393.57 (Junction US 163)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 393.57 (Junction US 163) to MP 434.87 (Junction US 191)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 434.87 (Junction US 191) to MP 437.22 (Junction US 191; BIA 12)	R17-6-403			Over 14' - 16' = F/R	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 160	MP 437.22 (Junction US 191; BIA 12) to MP 465.40 (Junction US 64)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 160	MP 465.40 (Junction US 64) to MP 470.73 (New Mexico State Line)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 163	MP 393.52 (Junction US 160) to MP 396.16 (Laguna Wash Bridge)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 163	MP 396.16 (Laguna Wash Bridge - Structure 25)	R17-6-403			Over 12' - 16' = F/R	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.
U.S. Highway 163	MP 396.16 (Laguna Wash Bridge) to MP 416.71 (Utah State Line)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 215.44 (Junction SB 40) to MP 265.82 (Junction SR 64)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 307.30 (Junction SR 77) to MP 343.13 (Junction SR 180A)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 343.13 (Junction SR 180A) to MP 358.44 (Junction SR 61)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 358.44 (Junction SR 61) to MP 368.92 (Junction US 191)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 368.92 (Junction US 191) to MP 394.36 (Junction US 60)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 400.61 (Junction US 60) to MP 426.33 (Junction US 191)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 180	MP 426.33 (Junction US 191) to MP 433.26 (New Mexico State Line)	R17-6-403			Over 12' - 16' = F/R	
U.S. Business 191	MP 0.00 (US/Mexico Border) to MP 1.15 (Junction SR 80, Douglas)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 1.15 (Junction SR 80, Douglas) to MP 38.12 (Junction SR 181)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 38.12 (Junction SR 181) to MP 66.55 (Junction I-10)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 87.43 (Junction I-10) to MP 104.38 (Junction SR 266)	R17-6-403			Over 14' - 16' = F/R	

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 191	MP 104.38 (Junction SR 266) to MP 113.69 (Junction SR 366)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 113.69 (Junction SR 366) to MP 121.02 (Junction US 70)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 130.60 (Junction US 70) to MP 154.90 Southbound (Cold Creek Bridge)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 154.90 Southbound (Cold Creek Bridge - Structure 258)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 154.90 Southbound (Cold Creek Bridge) to MP 163.95 (Temporary US 191, Clifton)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 179.36 (Junction at end of Temporary US 191) to MP 215.41 (Forest Service Route 25)	R17-6-403		Over 40' requires class C permit	Over 8' 6" requires class C permit	
U.S. Highway 191	MP 215.41 (Forest Service Route 25) to MP 253.74 (Junction US 180, Alpine)	R17-6-403			Over 8' 6" requires class C permit	
U.S. Highway 191	MP 315.55 (Junction US 180 in St Johns) to MP 344.49 (Junction SR 61)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 344.49 (Junction SR 61) to MP 368.50 (Junction I-40 in Sanders)	R17-6-403			Over 14' - 16' = F/R	
U.S. Highway 191	MP 374.00 (Junction I-40) to MP 411.63 (Junction SR 264, Ganado)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 191	MP 417.55 (Junction SR 264) to MP 510.34 (Junction US 160)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 191 Temp (UX 191)	MP 163.95 (Temporary US 191, Clifton) to MP 169.04 (Freeport-McMoRan Mine Entrance)	R17-6-403			Over 12' - 16' = F/R	
U.S. Highway 191 Temp (UX 191)	MP 169.04 (Freeport-McMoRan Mine Entrance) to MP 169.20 (Freeport-McMoRan Viaduct)	R17-6-403			Over 8' 6" requires class C permit	
U.S. Highway 191 Temp (UX 191)	MP 169.20 (Freeport-McMoRan Viaduct - Structure 1631)	R17-6-403			Over 8' 6" requires class C permit	Class A permitted vehicles with a gross weight of: 100,000 or less - no additional restrictions; 100,001 through 150,000 - drivers shall: Coordinate road closures by or under the direction of two law enforcement escorts; and Cross on center of bridge at a constant speed of no more than 10 mph while on bridge. 150,001 or more requires a Class C permit with special analysis and approval from the ADOT Bridge Group.

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Route	Restriction Location (MP = Milepost)	Transport Subject to:	Height	Length	Width	Weight (in lbs)
<b>Escort requirements: F = front escort, R = rear escort, F/R = front and rear escort, and LE = law enforcement escort</b>						
U.S. Highway 191 Temp (UX 191)	MP 169.20 (Freeport-McMoRan Viaduct) to MP 169.30 (Railroad Underpass)	R17-6-403			Over 8' 6" requires class C permit	
U.S. Highway 191 Temp (UX 191)	MP 169.30 (Railroad Underpass - Structure 1632)	R17-6-403	15'		Over 8' 6" requires class C permit	
U.S. Highway 191 Temp (UX 191)	MP 169.30 (Railroad Underpass) to MP 169.90 (Rock Tunnel)	R17-6-403			Over 8' 6" requires class C permit	
U.S. Highway 191 Temp (UX 191)	MP 169.90 (Rock Tunnel - Structure 1633)	R17-6-403	12' 7"		Over 8' 6" requires class C permit	
U.S. Highway 191 Temp (UX 191)	MP 169.90 (Rock Tunnel) to MP 179.36 (Junction at end of Temporary US 191)	R17-6-403			Over 8' 6" requires class C permit	

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-413. Renumbered**

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 4648, effective October 8, 2003 (Supp. 03-4). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-413 renumbered to R17-6-210 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Table 5. Renumbered**

**Historical Note**

New Table made by final rulemaking at 9 A.A.R. 4648, effective October 8, 2003 (Supp. 03-4). Table amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Table 5 codified after R17-6-413 renumbered to Table 5 after R1-6-210 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-414. Renumbered**

**Historical Note**

Section R17-6-414 renumbered from R17-6-407 and amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-414 renumbered to R17-6-409 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-415. Emergency Expired**

**Historical Note**

New Section made by emergency rulemaking at 19 A.A.R. 928, approved by the Attorney General April 24, 2013, effective for 180 days (Supp. 13-2). Emergency expired (Supp. 13-3).

**ARTICLE 5. ENVELOPE PERMIT SPECIAL PROVISIONS**

Article 5, consisting of Sections R17-6-501 through R17-6-505, made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1).

**R17-6-501. General Provisions; Definitions**

- A. The Department shall issue and regulate oversize and overweight envelope permits as provided under this Chapter. The Department implements these Sections under authority of A.R.S. §§ 28-366, 28-1111, 28-1142, 28-1144, 28-1146, 28-1149, and 28-7045, in collaboration with the Overdimensional Permit Council as prescribed under A.R.S. § 28-1150.
- B. An envelope permit issued by the Department under this Article is not applicable for transporting a modular or mobile home.
- C. Definitions applicable to this Article are prescribed under R17-6-101, A.R.S. § 28-101, and A.R.S. § 28-601.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-501 renumbered to R17-6-507; new Section R17-6-501 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-502. Envelope Permit - Non-specific and Non-reducible Vehicle or Load**

- A. The Department shall issue an annual or 30-day oversize envelope permit, or an annual or 30-day oversize and overweight envelope permit, according to the following criteria for a non-specific and non-reducible vehicle or load that meets the definition of envelope permit under R17-6-101, and does not exceed the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411:

Vehicle or load description	A non-specific and non-reducible vehicle or load that meets the definition of envelope permit under R17-6-101 and is within the maximum permitted weights provided under R17-6-411
Permit option	30-day oversize only
	30-day oversize and overweight
	Annual oversize only
	Annual oversize and overweight

CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

Fee (A.R.S. § 28-1143)	30-day oversize only	\$150
	30-day oversize and overweight	\$500
	Annual oversize only	\$750
	Annual oversize and overweight	\$1,500

- B. An applicant for an oversize, or oversize and overweight, envelope permit shall apply to the Department and submit appropriate fees using the application procedure provided under R17-6-503.
- C. An applicant for an oversize, or oversize and overweight, envelope permit provided by the Department under subsection (A) for a vehicle that is a self-propelled mobile crane, drilling rig, or similar specialty equipment meeting the dimensional requirements provided under R17-6-205, shall submit to the Department proof of gross weight:
  - 1. For initial application, a public weighmaster’s certificate of weight and measure issued at a certified public scale once the vehicle is equipped and set for highway travel; or
  - 2. For renewal application, a certification by the applicant that no dimension has changed and the vehicle does not exceed the originally certified dimensions or weights.
- D. An envelope permit holder shall apply to the Department for reissuance of the envelope permit to reflect any changes made to the permittee’s name, address, or substitute power units after initial issuance and shall pay the fees prescribed under A.R.S. § 28-1143, as follows:
  - 1. For a modified permit duplicate: \$25; or
  - 2. For each additional power unit exceeding the original number of permitted power units: \$50.
- E. A permittee or driver of an oversize or overweight vehicle or load shall not access a route listed under R17-6-412, Table 4, unless operating in full compliance with all indicated restrictions and requirements.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-502 renumbered to R17-6-508; new Section R17-6-502 renumbered from R17-6-210 and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-503. Envelope Permit - General Application Procedure**

- A. Unless otherwise provided in this Chapter, an applicant requesting an envelope permit for transport of an oversize, overweight, or oversize and overweight vehicle, combination of vehicles, or vehicle and load combination shall apply to the Department using the appropriate application method provided below for each type of permit required:
  - 1. For an envelope permit authorizing movement of a non-specific non-reducible vehicle, combination of vehicles, or vehicle and load combination with dimensions that do not exceed the class A oversize and overweight special permit limitations provided under R17-6-201:
    - a. Complete the online application process using the Department’s electronic permitting system available on the Department’s website; or
    - b. Complete an oversize/overweight envelope permit application form, available on the Department’s website, and mail or deliver the written application to the address indicated on the application.

- 2. For an envelope permit authorizing movement of a houseboat under A.R.S. § 28-1144(B), complete an envelope permit application form, available on the Department’s website, and mail or deliver the written application to the Port of Entry located in Page, Arizona.
- B. Unless otherwise provided under this Chapter, an applicant for an oversize or overweight envelope permit shall provide to the Department, at the time of application, all applicable fees and information required by the Department under R17-6-502 and this Section for issuance of an appropriate class of permit, including:
  - 1. Motor carrier related information:
    - a. Name and address of the applicant’s principal or established place of business;
    - b. Name, phone number, and email address of an official company representative; and
    - c. USDOT number;
  - 2. Power unit related information:
    - a. Vehicle make, body style, and year;
    - b. Vehicle identification number;
    - c. Unit number assigned;
    - d. License plate number; and
    - e. Base jurisdiction - state of registration;
  - 3. Evidence of valid registration as provided under A.R.S. § 28-2153; and
  - 4. Evidence of a valid IFTA license as provided under A.R.S. § 28-5742, if applicable.
- C. An applicant for an oversize or overweight envelope permit shall certify to the Department that all information provided on the application is true and correct.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-503 renumbered to R17-6-509; new Section R17-6-503 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-504. Envelope Permit - Class C Tridem Axle Group Configurations**

- A. The Department may issue a 30-day or annual oversize envelope permit, or oversize and overweight envelope permit under this Article, using the criteria provided under R17-6-212 for tridem axle group configurations. An envelope permit issued by the Department in accordance with the tridem axle group configuration criteria is also valid for movement of all class A non-specific and non-reducible vehicle or load combinations that meet the definition of envelope permit under R17-6-101.
- B. A permittee or driver issued an envelope permit for tridem axle group configurations under subsection (A) shall ensure that the non-specific and non-reducible vehicle or load combination transported under the envelope permit does not exceed the maximum permitted weight computations for overweight axle group weight distribution as provided under R17-6-411 or the maximum permitted weight of 60,000 pounds per tridem axle group, as applicable, subject to the routes and restrictions provided under R17-6-412, Table 4.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-504 renumbered to R17-6-510; new Section R17-6-504 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

**R17-6-505. Envelope Permit - Trip Authorization Process for Tridem Axle Group Configurations**

- A.** A permittee or driver issued an annual envelope permit under R17-6-504(A) shall:
1. Comply with all provisions applicable to the application, issuance, and maintenance of envelope permits issued by the Department under this Chapter; and
  2. Notify the Department before initiating transport of any vehicle, combination of vehicles, or vehicle and load combination using the annual envelope permit by:
    - a. Completing the electronic notification process made available by the Department on its website; and
    - b. Obtaining a trip-authorization number.
- B.** A permittee or driver shall carry the trip-authorization number in the vehicle with the annual envelope permit at all times during transport as confirmation that the notification process was completed.

**Historical Note**

New Section made by final rulemaking at 9 A.A.R. 665, effective April 8, 2003 (Supp. 03-1). Amended by final rulemaking at 19 A.A.R. 2486, effective September 7, 2013 (Supp. 13-3). Section R17-6-505 renumbered to R17-6-511; new Section R17-6-505 made by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-506. Page-Lake Powell Area Houseboat Hauling Envelope Permit**

- A.** An applicant requesting an envelope permit for a vehicle hauling a houseboat under A.R.S. § 28-1144(B) shall:
1. Apply to the Department using the application procedure provided under R17-6-503; and
  2. Pay the applicable fees prescribed under R17-6-502.
- B.** A permittee issued an envelope permit under this Section shall:
1. Comply with all provisions applicable to the application, issuance, and maintenance of envelope permits under this Chapter;
  2. Notify the Department as required under A.R.S. § 28-1144(B) before transporting a houseboat authorized by the envelope permit. This notification shall include at least the following information:
    - a. The number of the authorizing envelope permit;
    - b. The date of transport;
    - c. The transport origination;
    - d. The transport destination;
    - e. The name and hull identification number of the houseboat being transported;
    - f. The overall length, height, and width of the vehicle and load combination;
    - g. The overall gross weight of the vehicle and load combination; and
    - h. The total number of axles on the vehicle and load combination;
  3. Notify the Department each time information submitted under subsection (B)(2) changes by submitting a new notification to the Department; and
  4. Complete the notifications required under subsections (B)(2) and (B)(3) electronically through the Department's website at [www.azdot.gov](http://www.azdot.gov).

**Historical Note**

New Section made by final rulemaking at 19 A.A.R. 892, effective June 1, 2013 (Supp. 13-2). Amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-507. Envelope Permit Required Recordkeeping**

- A.** An envelope permit holder shall maintain in this state, for at least three years, records and other data for all vehicles operated, and cargo transported, under an envelope permit as required under A.R.S. § 28-1149. The records and other data shall include:
1. Bills of lading,
  2. Shipping manifests, and
  3. Time cards or invoices.
- B.** A record retained by an envelope permit holder under subsection (A) shall contain, at least, the following information:
1. Date of document preparation,
  2. Name of shipper and name of receiver,
  3. Address of load origination,
  4. Address of load destination, and
  5. Dates of transport.

**Historical Note**

New Section R17-6-507 renumbered from R17-6-501 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-508. Envelope Permit Suspension Point System**

The Director shall suspend an envelope permit, as prescribed under A.R.S. § 28-1147, by assigning points to the permittee for envelope permit violations as follows:

1. Minor violations - one point:
  - a. Improper or inadequate flagging as provided under R17-6-302 and R17-6-307,
  - b. Improper or inadequate lighting as provided under R17-6-304 and R17-6-307,
  - c. Improper or inadequate "OVERSIZE LOAD" signage display as provided under R17-6-303,
  - d. Use of an escort vehicle not equipped as provided under R17-6-305,
  - e. Failing to maintain proper follow-distance from another oversize or overweight vehicle or load as provided under R17-6-401, or
  - f. Exceeding permitted speed but not exceeding posted speed as provided under R17-6-401.
2. Major violations - three points:
  - a. Transporting a permitted vehicle or load on a highway restricted to certain hours of travel under Article 4 of this Chapter;
  - b. Failing to display flags or lights when required under R17-6-302, R17-6-304, or R17-6-307;
  - c. Failing to display "OVERSIZE LOAD" signage when required under R17-6-303;
  - d. Exceeding the posted speed limit; or
  - e. Transporting a reducible load under an envelope permit.
3. Weight Violations, 1-36 points:
  - a. Gross vehicle weight exceeds the maximum weight allowed under R17-6-411:
    - i. Less than 2% over allowable weight - one point,
    - ii. 2% but less than 4% over allowable weight - two points,
    - iii. 4% but less than 6% over allowable weight - three points,
    - iv. 6% but less than 9% over allowable weight - six points,
    - v. 9% but less than 12% over allowable weight - 10 points,
    - vi. 12% but less than 15% over allowable weight - 18 points, or
    - vii. 15% or more over allowable weight - 36 points.



## CHAPTER 6. DEPARTMENT OF TRANSPORTATION - OVERSIZE AND OVERWEIGHT SPECIAL PERMITS

- b. For each axle group exceeding the maximum weight allowed under R17-6-411:
- i. Less than 4% over allowable weight - one point,
  - ii. 4% but less than 6% over allowable weight - two points,
  - iii. 6% but less than 9% over allowable weight - four points,
  - iv. 9% but less than 12% over allowable weight - six points,
  - v. 12% but less than 15% over allowable weight - 10 points,
  - vi. 15% but less than 20% over allowable weight - 18 points, or
  - vii. 20% or more over allowable weight - 36 points.
4. Flagrant Violations - 36 points:
- a. Transporting a permitted load on a highway during a hazardous condition restricting travel under R17-6-405 or in violation of a law enforcement agency order,
  - b. Exceeding an envelope dimension as prescribed under A.R.S. § 28-1144,
  - c. Falsifying a permit application,
  - d. Altering a permit,
  - e. Failing to pay repair costs for highway damages as prescribed under A.R.S. § 28-1107,
  - f. Transporting a permitted load on a restricted highway or restricted bridge,
  - g. Failing to use an escort vehicle as required under this Chapter, or
  - h. Failing to use an escort vehicle with a driver that meets the standards provided under R17-6-305.
3. A permittee fails to maintain records as prescribed under R17-6-507 and A.R.S. § 28-1149.
- C. A permittee shall surrender the permit to the Department within 72 hours after an order of suspension or revocation is effective.
1. If the permittee fails to surrender the permit within five working days of written demand, the Director shall suspend the permittee's envelope permit privileges for one year in addition to any other penalty assessed.
  2. The Department shall retrieve the permit if the permittee fails to return the permit within the prescribed time.
- D. The Department shall not issue an envelope permit to a permittee during the permittee's period of suspension or revocation.

**Historical Note**

New Section R17-6-509 renumbered from R17-6-503, and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-510. Notice of Point Assessment, Denial, Suspension, or Revocation**

- A. The Department shall send to a permittee's last known address of record notice of the following:
1. Point assessment; or
  2. Permit denial, suspension, or revocation.
- B. The notice shall inform the permittee of:
1. The right to appeal the action, and
  2. The procedure for requesting a hearing.
- C. Any action taken under this Section becomes effective 25 days after the Department's action notice date unless a permittee submits a timely hearing request as provided under 17 A.A.C. 1, Article 5.

**Historical Note**

New Section R17-6-510 renumbered from R17-6-504 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-511. Envelope Permit Reapplication**

- A. An envelope permit applicant denied issuance by the Department, as prescribed under A.R.S. § 28-1142, shall not reapply for an envelope permit for two years from the date of denial.
- B. An envelope permit applicant, who has previously had an envelope permit revoked by the Department under A.R.S. § 28-1147, shall not reapply for an envelope permit for two years from the date of revocation.
- C. Upon reapplication, an applicant shall show by a preponderance of evidence that the underlying cause for denial or revocation has been removed.

**Historical Note**

New Section R17-6-511 renumbered from R17-6-505 by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**Historical Note**

New Section R17-6-508 renumbered from R17-6-502, and amended by final rulemaking at 28 A.A.R. 1263 (June 10, 2022), effective July 8, 2022 (Supp. 22-2).

**R17-6-509. Envelope Permit Suspension; Revocation; Enforcement**

- A. The Director shall suspend an envelope permit for point accumulation within any 12-month period according to the following schedule:
1. 14-19 points, one-week suspension;
  2. 20-29 points, two-week suspension;
  3. 30-35 points, four-week suspension; and
  4. More than 35 points, one-year suspension.
- B. The Director shall revoke an envelope permit as provided under A.R.S. § 28-1147 for the following reasons:
1. Frequency of violation indicates a flagrant disregard for the law or the safety of the public,
  2. A permittee does not have an established place of business, or

**Arizona Department of Transportation**  
**Five-year Review Report**  
**17 A.A.C. Chapter 6**

**Section D**

**Statutory Authority, Definitions, and Other Applicable Rules**

**TITLE 17. TRANSPORTATION**  
**CHAPTER 6. DEPARTMENT OF TRANSPORTATION**  
**OVERDIMENSIONAL PERMITS**

**R17-6-101 through R17-6-505**  
**(All Sections, Tables, and Illustrations)**

**A.R.S. § 28-363. Duties of the director; administration.**

A. The director shall:

1. Supervise and administer the overall activities of the department and its divisions and employees.
2. Appoint assistant directors for each of the divisions.
3. Provide for the assembly and distribution of information to the public concerning department activities.
4. Delegate functions, duties or powers as the director deems necessary to carry out the efficient operation of the department.
5. Exercise complete and exclusive operational control and jurisdiction over the use of state highways and routes.
6. Coordinate the design, right-of-way purchase and construction of controlled access highways that are either state routes or state highways and related grade separations of controlled access highways.
7. Coordinate the design, right-of-way purchase, construction, standard and reduced clearance grade separation, extension and widening of arterial streets and highways under chapters 17 and 18 of this title.
8. Assist regional transportation planning agencies, councils of government, tribal governments, counties, cities and towns in the development of their regional and local transportation plans to ensure that the streets, highways and other regionally significant modes of transportation within each county form an integrated and efficient regional system.
9. Designate the necessary agencies for enforcing the provisions of the laws the director administers or enforces.
10. Exercise other duties or powers as the director deems necessary to carry out the efficient operation of the department.
11. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.
12. Develop a plan to increase use of bypass routes by vehicles on days of poor visibility in the Phoenix metropolitan area.

B. The assistant directors appointed pursuant to subsection A of this section are subject to title 41, chapter 4, article 4.

- C. The director shall not spend any monies, adopt any rules or implement any policies or programs to convert signs to the metric system or to require the use of the metric system with respect to designing or preparing plans, specifications, estimates or other documents for any highway project before the conversion or use is required by federal law, except that the director may:
1. Spend monies and require the use of the metric system with respect to designing or preparing plans, specifications, estimates or other documents for a highway project that is awarded before October 1, 1997 and that is exclusively metric from its inception.
  2. Prepare for conversion to and use of the metric system not more than six months before the conversion or use is required by federal law.

**A.R.S. § 28-366. Director; rules.**

The director shall adopt rules pursuant to title 41, chapter 6 as the director deems necessary for:

1. Collection of taxes and license fees.
2. Public safety and convenience.
3. Enforcement of the provisions of the laws the director administers or enforces.
4. The use of state highways and routes to prevent the abuse and unauthorized use of state highways and routes.

**A.R.S. § 28-1095. Vehicle length; exceptions; permits; rules; definitions**

- A. A vehicle, including any load on the vehicle, shall not exceed a length of forty feet extreme overall dimension, including front and rear bumpers. This subsection does not apply to any of the following:
1. A semitrailer when used in combination with a truck or a truck tractor.
  2. A truck that is equipped with a conveyor bed, that is used solely as a fiber and forage module mover and that does not exceed forty-eight feet in length.
  3. An articulated bus or articulated trolley coach that does not exceed a length of sixty feet.
  4. A bus that is not articulated and that does not exceed a length of forty-five feet.
  5. A recreational vehicle, a power unit, a farm vehicle, a horse trailer or wheeled equipment as defined in section 28-2153 if used in combination with two units and if the combination does not exceed sixty-five feet in length.
  6. A recreational vehicle as defined in section 41-4001, paragraph 33, subdivision (b) that does not exceed a length of forty-five feet.
- B. A vehicle transporter may draw only one semitrailer. A combination of vehicles, excluding a vehicle transporter and the semitrailer it draws, that is coupled together shall not consist of more than two units, except that a truck or a truck tractor and semitrailer may draw either one trailer or a forklift.
- C. The following restrictions apply:
1. The length of a semitrailer operating in a truck tractor-semitrailer combination or a truck tractor-semitrailer-forklift combination shall not exceed fifty-seven feet six inches.

2. The length of a semitrailer or trailer operating in a truck tractor-semi-trailer-trailer combination shall not exceed twenty-eight feet six inches.
  3. The length of a trailer operating in a truck-trailer combination shall not exceed twenty-eight feet six inches.
  4. If the length of a semitrailer is more than fifty-three feet, the overall length of a truck tractor-semi-trailer combination shall not exceed sixty-five feet on all highways, except for the national intercity truck route network designated by the United States secretary of transportation as required by the surface transportation assistance act of 1982 or on a system of highways that is designated by a local authority. In designating the streets, the local authority shall consider any reasonable restriction including such safety restrictions as structural hazards and street width and any other safety factors identified by the local authority as a hazard to the motoring public.
  5. A vehicle transporter and the semitrailer it draws shall not exceed a length of eighty feet with a front overhang of not more than four feet and a rear overhang of not more than six feet.
  6. A truck-semi-trailer combination shall not exceed an overall length of sixty-five feet.
- D. Subsection B and subsection C, paragraphs 1 through 6 of this section do not apply to damaged, disabled or abandoned vehicles or combinations of vehicles while being towed by a tow truck in compliance with section 28-1108.
- E. Notwithstanding subsections B and C of this section, extensions of not more than three feet beyond the foremost part and six feet beyond the rear bed or body of a vehicle or combination of vehicles used to transport manufactured vehicles or fiber and forage shall not be included in measuring the length of the vehicle or combination of vehicles when loaded.
- F. Pursuant to a permit issued pursuant to section 28-1103, a truck or a truck tractor-semi-trailer may draw not more than two additional trailers or semi-trailers. The department shall adopt rules governing the movement and safety of a combination of vehicles under this subsection and authorizing the issuance in advance of prepaid permits. The rules shall include the adoption of minimum speeds on grades, lighting, signing, identification and braking requirements and any other rules the department deems necessary. The permit issued pursuant to this subsection is limited to the following highways:
1. An interstate highway that connects with two states if both states allow such combinations of trailers or semi-trailers and if the interstate highway does not exceed forty miles between the connecting states.
  2. A state route or highway that is located within four miles of and extends to the border of this state and an adjacent state that allows such combinations of trailers or semi-trailers.
  3. A state route or highway that extends at least ten miles through an Indian reservation, that does not cross the Colorado river and that is located within twenty miles of and extends to the border of this state and an adjacent state that allows such combinations of trailers or semi-trailers.
- G. Notwithstanding subsections B and C of this section:
1. A motor vehicle may draw one single-axle tow dolly on which a motor vehicle may be transported. A person shall secure the raised end of any motor vehicle being transported pursuant to this paragraph to the

tow dolly by two separate chains, cables or equivalent devices adequate to prevent shifting or separation of the drawn vehicle and the tow dolly.

2. A truck or a truck tractor may draw a trailer or semitrailer that does not exceed a length of fifty-seven feet only on an interstate highway or on a highway that is within ten miles of an interstate highway if the trailer or semitrailer is manufactured in this state and is traveling with or without a load from its place of manufacture to be delivered for use outside this state.
3. A recreational vehicle may pull two units if all of the following conditions are met:
  - (a) The middle unit is equipped with a fifth wheel and brakes. The middle unit may be a farm vehicle or a horse trailer and shall have a weight equal to or greater than the rear unit.
  - (b) If the rear unit has a gross weight of three thousand pounds or more, it is equipped with brakes.
  - (c) The total combined gross weight of the towed units does not exceed the manufacturer's stated gross vehicle weight of the towing unit.
4. A vehicle transporter may transport cargo or general freight on a backhaul in compliance with section 28-1100.

H. For the purposes of this section:

1. "Backhaul" means the return trip of a vehicle transporter carrying cargo or general freight over all or part of the same route.
2. "Farm vehicle" has the same meaning prescribed in section 28-2514.
3. "Recreational vehicle" means a motor vehicle that is designed and customarily used for private pleasure, including vehicles commonly called motor homes, pickup trucks with campers and pickup trucks with a fifth wheel trailing device.

**A.R.S. § 28-1103. Excess size and weight special permits; definition**

- A. Subject to section 28-1104, subsection E, on application in writing and for good cause, the director with respect to highways under the jurisdiction of the department and a local authority with respect to highways under its jurisdiction may issue a special permit in writing authorizing the applicant to operate or move a vehicle or combination of vehicles of a size or weight of vehicle or load exceeding the maximum specified in this article or otherwise not in conformity with this chapter on any highway under the jurisdiction of the party granting the permit and for the maintenance of which the party is responsible.
- B. A special permit may be issued for the movement of overdimensional and overweight loads that is subject to department rules for overdimensional and overweight loads. The director shall adopt rules for overdimensional and overweight loads. The director may establish fees to cover all or part of the cost of review and analysis of requests for overdimensional and overweight load permits. The department shall collect the fees, in addition to the special permit fee provided by this section or section 28-1105.
- C. Subject to this section, the director or local authority may issue the following special permits that are valid for thirty days or one year and that may be limited by the director or local authority:

1. A special permit authorizing the applicant to transport a load by means of a truck-semitrailer, truck-trailer, truck tractor-semi-trailer-semi-trailer or truck tractor-semi-trailer-trailer combination, if all of the following conditions are met:
    - (a) The overall length of the cargo carrying unit of the vehicle combination does not exceed ninety-five feet.
    - (b) The axle weight limitations are subject to sections 28-1099 and 28-1100.
    - (c) The overall gross weight of the vehicle combination does not exceed one hundred twenty-nine thousand pounds.
    - (d) The vehicle combination is traveling within twenty miles of the borders of this state and an adjacent state that allows such combinations of length and gross vehicle weight.
  2. Except on the national intercity truck route network designated by the United States secretary of transportation as required by the surface transportation assistance act of 1982, a special permit authorizing the applicant to transport a load by means of a truck and two trailing units or a truck tractor, a semi-trailer and two trailing units if all of the following conditions are met:
    - (a) The overall length of the cargo carrying unit of the vehicle combination does not exceed ninety-five feet.
    - (b) The axle weight limitations conform to sections 28-1099 and 28-1100.
    - (c) The overall gross weight of the vehicle combination does not exceed one hundred twenty-three thousand five hundred pounds.
    - (d) The vehicle combination is traveling on either:
      - (i) A state route or highway that is located within four miles of and extends to the border of this state and an adjacent state that allows vehicle combinations of a truck or a truck tractor-semi-trailer and not more than two additional trailers or semi-trailers.
      - (ii) A state route or highway that extends at least ten miles through an Indian reservation, does not cross the Colorado river and is located within twenty miles of and extends to the border of this state and an adjacent state that allows such combinations of trailers or semi-trailers.
  3. On application in writing by an owner of a watercraft as defined in section 5-301 and on good cause shown, a special excess width permit for a fee of forty-five dollars for each watercraft covered by the permit that:
    - (a) Authorizes the owner to move a vehicle loaded with the watercraft on a highway under the jurisdiction of the issuer if all of the following conditions exist:
      - (i) The total outside width of the vehicle and watercraft does not exceed ten feet.
      - (ii) The vehicle loaded with the watercraft is otherwise in conformity with the limitations prescribed by this chapter.
      - (iii) The watercraft is properly registered with the Arizona game and fish department.
    - (b) Contains the watercraft registration number.
- D. The director may issue a special excess width permit for the operation of a vehicle with a reducible load only if both:

1. The load exceeds the width limitation prescribed in section 28-1093.
  2. The load does not exceed ten feet in width.
- E. Subject to this section and on receipt of an application, the director or local authority shall issue a permit that is valid for thirty days or one year and that authorizes the commercial movement of recreational vehicles as defined in section 41-4001 that exceed the size restrictions prescribed in this article. There is no limit on the number of movements generated or the number of vehicles moved by the permittee under a permit issued pursuant to this subsection. Notwithstanding section 28-1104, additional permit requirements shall not be imposed on the commercial movement of these recreational vehicles if the recreational vehicles comply with section 28-1093, subsection D.
- F. If a local authority issues permits pursuant to this section, the local authority shall adopt and enforce ordinances that are substantially identical to rules adopted by the department that relate to overdimensional or overweight commercial vehicles, and the local authority may adopt ordinances relating to infrastructure restrictions, route restrictions and time-of-day restrictions. The local authority shall provide to the department in a timely manner in an electronic format prescribed by the director all current ordinances and rules of the local authority relating to the permits. The department shall:
1. Make the ordinances and rules available to the public in an electronic format.
  2. Notify a local authority of any updates or changes to rules established by the department.
- G. Before the adoption and enforcement of an ordinance by a local authority pursuant to subsection F of this section, the engineer or designated officer having jurisdiction over the highways within the local authority shall submit the proposed ordinance to the department and the department shall submit the proposed ordinance to the overdimensional permit council established by section 28-1150 for review.
- H. The overdimensional permit council has ninety days after the date that the department receives the proposed ordinance pursuant to subsection G of this section to review the proposed ordinance for compliance with subsection F of this section. The proposed ordinance is deemed compliant if the overdimensional permit council does not act within ninety days as prescribed by this subsection. If the overdimensional permit council determines that the proposed ordinance does not comply with subsection F of this section, the overdimensional permit council shall notify the department of the noncompliance before the end of the ninety-day period. The department shall notify the engineer or designated officer with jurisdiction over highways of the local authority in writing within thirty days after the review and provide specific provisions and the council's reasons that the ordinance is not in compliance with subsection F of this section.
- I. On receipt of written notification that the proposed ordinance is not in compliance with subsection F of this section, the local authority shall make changes as applicable. If the local authority accepts the overdimensional permit council's recommended changes, further review is not required. If the local authority makes any other substantial change to the ordinance after the overdimensional permit council's review the local authority shall resubmit the change to the department for review pursuant to subsection g of this section.
- J. This section does not limit a local authority's power to restrict highway use pursuant to section 28-1106.



- K. The department is immune from liability for providing to the public a local authority's ordinances or rules relating to permits issued by the local authority pursuant to this section if the department relies on the information submitted by the local authority in good faith.
- L. For the purposes of this section, "cargo carrying unit" means any portion of a commercial motor vehicle combination used for the carrying of cargo, including a trailer, a semitrailer or the cargo carrying section of a single unit truck. Cargo carrying unit does not include the cab portion of a truck or truck tractor.

**A.R.S. § 28-1104. Issuance of special permits; rules**

- A. The application for a special permit prescribed in section 28-1103 shall specifically describe the vehicle or vehicles and load to be operated or moved and the particular highways for which the permit to operate is requested. If the actual vehicle and load to be moved are subsequently of a lesser dimension or weight than that described on the permit, both of the following apply:
  - 1. The director shall not require the operator to apply for a new permit or pay an additional fee.
  - 2. The operator shall comply with all other conditions of the permit.
- B. Subject to subsection E of this section and if the special permit is issued, the director or local authority may:
  - 1. Establish seasonal or other time limitations within which the vehicles described may be operated on the highways indicated or otherwise limit or prescribe conditions of operation of the vehicle or vehicles, when necessary to assure against undue damage to the road foundations, surfaces or structures.
  - 2. Require an undertaking or any other security as deemed necessary to compensate for an injury to a roadway or road structure.
- C. The special permit shall be carried in the vehicle or combination of vehicles to which it refers and shall be open to inspection by any police officer or authorized agent of an authority granting the permit. A person shall not violate any of the terms or conditions of the special permit.
- D. The director shall adopt rules for the movement of equipment without a special permit for the purpose of repair or for local operation.
- E. A permit shall not be issued pursuant to section 28-1103 for moving a mobile home unless the applicant provides evidence of payment of all applicable ad valorem taxes or a clearance from the assessor of the county in which the mobile home is located. The clearance is valid for not more than thirty days, and the assessor shall issue the clearance if the assessor determines that all fees and ad valorem taxes applicable to the mobile home pursuant to title 42 have been paid as of the date of application. This subsection does not limit the discretion of the director or local authority to deny an application for a permit for moving a mobile home for reasons other than nonpayment of ad valorem taxes.

**A.R.S. § 28-1105. Special permit fees**

- A. Except as otherwise provided by law, the following fees are required:

1. Fifteen dollars for each special permit issued pursuant to section 28-1103 for excess size, except that a thirty dollar fee is required for each thirty day permit and a three hundred sixty dollar fee is required for each annual permit.
  2. Except as provided in paragraph 4 of this subsection, seventy-five dollars for each permit and each thirty day permit issued pursuant to section 28-1103 for excess weight, except that a six hundred dollar fee is required for each annual permit. For commercial vehicles traveling through an international port of entry on a special single trip excess weight permit issued pursuant to section 28-1103, notwithstanding section 28-6538, each month the department shall allocate and the state treasurer shall distribute the seventy-five dollar special single trip permit fee collected pursuant to this paragraph as follows:
    - (a) To the state highway fund established by section 28-6991, fifty per cent.
    - (b) To counties located in the twenty-five mile commercial border zone identified on the permit, twenty-five per cent.
    - (c) To incorporated cities and towns located in the twenty-five mile commercial border zone identified on the permit, twenty-five per cent. Revenues allocated to incorporated cities and towns pursuant to this subdivision shall be apportioned to each city or town on the basis that the population of each bears to the population of all cities and towns located in the twenty-five mile commercial border zone identified on the permit.
  3. Except as provided in paragraph 4 of this subsection, for a permit requested for a motor vehicle or combination of vehicles that is in excess of both the size and weight permitted by this chapter, the amount of fees applicable for an excess weight permit.
  4. For a vehicle combination described in section 28-1103, subsection C:
    - (a) Seventy-five dollars for each single trip or thirty-day permit issued for excess size and weight.
    - (b) Three hundred sixty dollars for each annual permit issued for excess size and weight up to one hundred twenty-three thousand five hundred pounds.
    - (c) Six hundred dollars for each annual permit issued for excess size and weight more than one hundred twenty-three thousand five hundred pounds and up to one hundred twenty-nine thousand pounds.
- B. A fee is not required for a permit issued pursuant to section 28-1103 for the movement of vehicles or combinations of vehicles owned by the United States government, this state or a county, city or town.
- C. If a special permit is required by the director and by one or more authorities to move a vehicle or combination of vehicles, the applicant for the permit or permits shall pay a permit fee only to the director and is not required to pay a permit fee to a local authority.
- D. If a special permit is required by more than one local authority to move a vehicle or combination of vehicles and if the permit is not required by the director, the applicant shall pay a permit fee only to the local authority that has jurisdiction of the streets and highways where the movements of the vehicle or combination of vehicles originate.

**A.R.S. § 28-1111. Commercial and noncommercial vehicles and trailers; website publications**

- A. In cooperation with the department of public safety, the department of transportation shall develop easily understandable publications of the laws, rules and department policies relating to commercial and noncommercial motor vehicles, trailers and vehicle combinations that contain the following:
  - 1. Weight thresholds specifying the differences between commercial and noncommercial vehicles and vehicle combinations.
  - 2. Equipment requirements for different weight classes of commercial and noncommercial vehicles and vehicle combinations.
  - 3. Allowable vehicle combinations.
  - 4. Other information the director deems necessary.
- B. The department of transportation and the department of public safety shall jointly develop and publish on the website of each agency the information prescribed by subsection A no later than January 1, 2009.

**A.R.S. § 28-1142. Application**

- A. A person shall not operate, move or leave standing on a highway of this state a vehicle that is carrying or transporting cargo and that is required to have a permit for excess size or weight or that is otherwise not in conformity with this chapter unless the department issued an envelope permit or the person obtained a permit pursuant to section 28-1103.
- B. A person shall submit an application for an envelope permit to the director in writing on a form prescribed and furnished by the director. The application shall be verified and shall state:
  - 1. The principal place of business of the applicant.
  - 2. The established place of business or the place of business at or from which the business is to be conducted.
  - 3. The vehicle identification number of and the make of the vehicle that the applicant lists as an authorized vehicle on the envelope permit.
  - 4. Other information the director requires.
- C. The director shall deny an application for an envelope permit if the applicant knowingly makes a misrepresentation, misstatement or material omission of information on the application. A person who is denied an envelope permit pursuant to this subsection is not eligible to reapply for an envelope permit for a period of up to twenty-four months from the date of the denial.
- D. This article, article 18 of this chapter and department rules relating to envelope permits and overdimensional permits apply if a local authority does not issue permits pursuant to section 28-1103.
- E. The department shall make its rules relating to envelope permits and overdimensional permits electronically available in a format that is the same or similar to the format prescribed by the director pursuant to section 28-1103.

**A.R.S. § 28-1143. Fees**

- A. The department shall collect the following fees:
  - 1. One hundred fifty dollars for each thirty day oversize only envelope permit.

2. Five hundred dollars for a thirty day oversize and overweight envelope permit.
  3. Seven hundred fifty dollars for an annual oversize only envelope permit.
  4. One thousand five hundred dollars for an annual oversize and overweight envelope permit.
  5. Fifty dollars for each power unit that is added and that exceeds the original number of units on the envelope permit as issued.
  6. Twenty-five dollars for reissuing an envelope permit to reflect a change in the envelope permit holder's name, address or substitute power units if the reissued permit does not contain a change in the number of power units or the date of expiration.
- B. The director shall deposit, pursuant to sections 35-146 and 35-147, twenty-five per cent of the fees collected pursuant to this section in the state highway fund established by section 28-6991. Subject to legislative appropriation, the director shall use monies deposited in the state highway fund pursuant to this section to carry out the duties imposed by this article.

**A.R.S. § 28-1144. Issuing envelope permits; restrictions; requirements**

- A. Except as provided in subsection D of this section, on approval of the application, the director may issue an envelope permit. The envelope permit for a nonspecific and nonreducible vehicle or cargo shall not authorize a vehicle or a vehicle transporting cargo on a highway to exceed two hundred fifty thousand pounds gross weight, fourteen feet in width, sixteen feet in height and one hundred twenty feet in length.
- B. The director may issue an envelope permit for a vehicle hauling a houseboat within a ten mile radius of a lake that is located in this state and the state of Utah and whose tributary is the Colorado River if the vehicle or load does not exceed one hundred fifty thousand pounds gross weight, sixteen and one-half feet in width, twenty-five feet in height and one hundred twenty feet in length. A person who operates a vehicle on a highway transporting a houseboat for which an envelope permit has been issued pursuant to this subsection must notify the department as prescribed by the director each time a vehicle hauls a houseboat as authorized by the envelope permit. A person who violates the notification requirement of this subsection subjects the envelope permit to immediate revocation by the department and must apply for a special permit prescribed in section 28-1103 in order to comply with article 18 of this chapter relating to vehicle size, weight and load. The director shall adopt rules, including establishing fees, for envelope permits for vehicles hauling houseboats pursuant to this subsection.
- C. Except as provided in subsection D of this section, a vehicle for which an envelope permit is issued shall have at least three axles. Except for excess gross weight, excess width or length authorized by the envelope permit, a vehicle and cargo shall meet the requirements of statutes, rules and ordinances governing the movement of vehicles on highways and rules of local authorities.
- D. On approval of the application, the director may issue an envelope permit for a vehicle with two axles that is transporting a nonspecific and nonreducible vehicle or cargo on a highway if the vehicle or vehicle transporting cargo does not exceed the applicable maximum gross weight limits as prescribed in section 28-1100, fourteen feet in width, sixteen feet in height and one hundred twenty feet in length.

- E. A person who operates a vehicle on a highway transporting cargo for which an envelope permit has been issued and is required shall have a legible envelope permit in the person's immediate possession. The envelope permit is valid only if the power unit towing or transporting the cargo is listed on the permit. The operator shall display the envelope permit on demand of a peace officer.
- F. A photocopy or facsimile of the envelope permit is not valid.
- G. An envelope permit shall provide for the listing of any number of power units on the permit. A permit may be duplicated and modified to include the listing of additional power units at the time of initial application or later.
- H. The director shall not issue an envelope permit for a vehicle or vehicle combination that transports cargo commonly known as a mobile or modular home.

**A.R.S. § 28-1146. Administration**

- A. The director shall regulate all persons required by this article to have envelope permits.
- B. The director may:
  - 1. Investigate and require the assistance of the department of public safety or county or local law enforcement agencies in its investigation.
  - 2. Conduct hearings.
  - 3. Compel the attendance of witnesses at the hearings.

**A.R.S. § 28-1147. Revocation or suspension of envelope permits and privileges**

- A. The director may suspend or revoke an envelope permit if the director determines that the person:
  - 1. Made a material misrepresentation or misstatement in the application for an envelope permit.
  - 2. Violated or is violating either:
    - (a) A law of this state governing the movement of vehicles on the highways.
    - (b) A rule adopted by the director or a local authority.
  - 3. Does not have an established place of business or principal place of business.
  - 4. Failed or is failing to maintain records that are required to be maintained.
- B. On determining that grounds for suspension or revocation of an envelope permit exist, the director shall give notice to the person in writing of the suspension or revocation. The notice shall require the person to appear before the director at a specified time and place to show cause why the envelope permit should not be suspended or revoked. The director shall set the time and place for the hearing. The licensee may appear and be heard at the hearing and other persons may be present and may testify at the hearing. The order of suspension or revocation is final if a response is not received from the permittee within fifteen days of the date the notice for hearing was mailed.
- C. If the envelope permit of a person is suspended for a violation of this article, the suspension is not effective for more than two years. If the envelope permit is revoked for a violation of this article, the person may apply for a new envelope permit after two years. The director shall make a written order that suspends or revokes or declines to suspend or revoke the envelope permit.

- D. If the director determines that a person failed to obtain an envelope permit or a permit under section 28-1103, the director may suspend the privilege of obtaining subsequent permits for two years from the date of the suspension. A person whose permit privileges are suspended may request a hearing within fifteen days to show cause why the envelope permit privileges should not be reinstated. At the time and place fixed by the director, the person shall appear and be heard and other persons may be present and may testify at the hearing.
- E. Decisions of the director are subject to judicial review pursuant to title 12, chapter 7, article 6.

**A.R.S. § 28-1149. Records; inspection**

- A. A permit holder shall maintain in this state for at least three years records and other data for all vehicles operated and cargo transported under an envelope permit.
- B. The director may prescribe uniform forms for the keeping of records and other data.
- C. During usual business hours or at any other time if needed to protect public safety, the permit holder shall allow department employees or state or local peace officers to inspect the permit holder's records and other data.

**A.R.S. § 28-1150. Overdimensional permit council**

- A. The overdimensional permit council is established consisting of the following nine members who are appointed by the governor:
  - 1. One member representing the department of public safety.
  - 2. One member representing the department of transportation.
  - 3. Four members representing motor carriers.
  - 4. One member from a city or town with a population of more than one hundred thousand persons.
  - 5. One member from a city or town with a population of one hundred thousand persons or less.
  - 6. One member representing the governor's office of highway safety.
- B. The members serve staggered three year terms.
- C. The overdimensional permit council shall:
  - 1. Meet at least annually.
  - 2. Select from its members a person to serve as chairperson.
  - 3. Advise and assist the department of transportation in developing rules required to administer this article and article 18 of this chapter.
  - 4. Advise and consult with the motor carrier industry, department of transportation and state and local law enforcement agencies concerning matters relating to overdimensional permits.
  - 5. Review each proposed ordinance that a local authority submits pursuant to section 28-1103, subsection G to determine if the proposed ordinance is substantially identical, uniform and consistent with the rules adopted by the department for oversized or overweight vehicles pursuant to section 28-1103, subsection F.
- D. Members of the overdimensional permit council are not eligible to receive compensation or reimbursement for expenses.
- E. The overdimensional permit council is subject to title 38, chapter 3, article 3.1.

- F. The department shall provide for electronic notification of overdimensional permit council meetings to interested parties.

**A.R.S. § 28-5204. Administration and enforcement; rules**

- A. In the administration and enforcement of this chapter, the department of transportation shall adopt:
1. Reasonable rules it deems proper governing the safety operations of motor carriers, including rules governing safety operations of motor carriers, shippers and vehicles transporting hazardous materials, hazardous substances or hazardous wastes and shall prescribe necessary forms. In determining reasonable rules, the department of transportation shall consider:
    - (a) The nature of the operations and regulation of public service corporations as defined in article XV, sections 2 and 10, Constitution of Arizona.
    - (b) Rules adopted by the director of environmental quality pursuant to section 49-855.
  2. Rules necessary to enforce and administer this chapter, including rules setting forth reasonable procedures to be followed in the enforcement of this chapter and rules adopting transporter safety standards for hazardous materials, hazardous substances and hazardous waste. In adopting the rules, the department shall consider, as evidence of generally accepted safety standards, the publications of the United States department of transportation and the environmental protection agency.
- B. Rules adopted by the department of transportation also apply to a manufacturer, shipper, motor carrier and driver.
- C. The department of public safety shall and a political subdivision may enforce this chapter and any rule adopted pursuant to this chapter by the department of transportation. A person acting for a political subdivision in enforcing this chapter is required to be certified by the department of public safety as qualified for the enforcement activities.
- D. The department may audit records and inspect vehicles that are subject to this chapter.

**A.R.S. § 28-7045. Director; state highway and route use; rules.**

The director shall exercise complete and exclusive operational control and jurisdiction over the use of state highways and routes and adopt rules regarding the use as the director deems necessary to prevent the abuse and unauthorized use of these highways and routes.

**A.R.S. § 42-19157. Collection of delinquent taxes**

- A. Except as otherwise prescribed by this article, if a person who is liable for paying tax under this article evades or is delinquent in paying the tax, the tax shall be collected in the manner and by the officers prescribed by this chapter for collecting delinquent taxes on personal property.
- B. Notwithstanding any other law, for a mobile home for which an affidavit of affixture has not been recorded pursuant to section 42-15203, that is not placed on the real property roll and that is the owner's primary

residence, the delinquent tax may be collected pursuant to subsection A of this section only after both of the following occur:

1. The tax has been delinquent for a period of one year.
  2. The person liable for paying the tax has not redeemed the property within six months after the end of the one-year period prescribed in paragraph 1 of this subsection.
- C. For delinquent tax report purposes, the county treasurer and the officers prescribed by this chapter shall use the method and procedures of identifying mobile homes as prescribed by the department of transportation.

### 23 U.S.C. § 127. Vehicle weight limitations—Interstate System

(a) In General.—

- (1) The Secretary shall withhold 50 percent of the apportionment of a State under section 104(b)(1) in any fiscal year in which the State does not permit the use of The Dwight D. Eisenhower System of Interstate and Defense Highways within its boundaries by vehicles with a weight of twenty thousand pounds carried on any one axle, including enforcement tolerances, or with a tandem axle weight of thirty-four thousand pounds, including enforcement tolerances, or a gross weight of at least eighty thousand pounds for vehicle combinations of five axles or more.
- (2) However, the maximum gross weight to be allowed by any State for vehicles using The Dwight D. Eisenhower System of Interstate and Defense Highways shall be twenty thousand pounds carried on one axle, including enforcement tolerances, and a tandem axle weight of thirty-four thousand pounds, including enforcement tolerances and with an overall maximum gross weight, including enforcement tolerances, on a group of two or more consecutive axles produced by application of the following formula:

$$W=500 \left( \frac{LN}{N-1} + 12N + 36 \right)$$

where W equals overall gross weight on any group of two or more consecutive axles to the nearest five hundred pounds, L equals distance in feet between the extreme of any group of two or more consecutive axles, and N equals number of axles in group under consideration, except that two consecutive sets of tandem axles may carry a gross load of thirty-four thousand pounds each providing the overall distance between the first and last axles of such consecutive sets of tandem axles (1) is thirty-six feet or more, or (2) in the case of a motor vehicle hauling any tank trailer, dump trailer, or ocean transport container before September 1, 1989, is 30 feet or more: Provided, That such overall gross weight may not exceed eighty thousand pounds, including all enforcement tolerances, except for vehicles using Interstate Route 29 between Sioux City, Iowa, and the border between Iowa and South Dakota or vehicles using Interstate Route 129 between Sioux City, Iowa, and the border between Iowa and Nebraska, and except for those vehicles and loads which cannot be easily dismantled or divided and which have been issued special permits in accordance with applicable State laws, or the corresponding maximum weights permitted for vehicles using the public highways of such State under laws or regulations established by appropriate State authority in effect on July 1, 1956, except in the case of the overall gross weight of any group of two or



more consecutive axles on any vehicle (other than a vehicle comprised of a motor vehicle hauling any tank trailer, dump trailer, or ocean transport container on or after September 1, 1989), on the date of enactment of the Federal-Aid Highway Amendments of 1974, whichever is the greater.

- (3) Any amount which is withheld from apportionment to any State pursuant to the foregoing provisions shall lapse if not released and obligated within the availability period specified in section 118(b).
- (4) This section shall not be construed to deny apportionment to any State allowing the operation within such State of any vehicles or combinations thereof, other than vehicles or combinations subject to subsection (d) of this section, which the State determines could be lawfully operated within such State on July 1, 1956, except in the case of the overall gross weight of any group of two or more consecutive axles, on the date of enactment of the Federal-Aid Highway Amendments of 1974.
- (5) With respect to the State of Hawaii, laws or regulations in effect on February 1, 1960, shall be applicable for the purposes of this section in lieu of those in effect on July 1, 1956.
- (6) With respect to the State of Colorado, vehicles designed to carry 2 or more precast concrete panels shall be considered a nondivisible load.
- (7) With respect to the State of Michigan, laws or regulations in effect on May 1, 1982, shall be applicable for the purposes of this subsection.
- (8) With respect to the State of Maryland, laws and regulations in effect on June 1, 1993, shall be applicable for the purposes of this subsection.
- (9) The State of Louisiana may allow, by special permit, the operation of vehicles with a gross vehicle weight of up to 100,000 pounds for the hauling of sugarcane during the harvest season, not to exceed 100 days annually.
- (10) With respect to Interstate Routes 89, 93, and 95 in the State of New Hampshire, State laws (including regulations) concerning vehicle weight limitations that were in effect on January 1, 1987, and are applicable to State highways other than the Interstate System, shall be applicable in lieu of the requirements of this subsection.
- (11)(A) With respect to all portions of the Interstate Highway System in the State of Maine, laws (including regulations) of that State concerning vehicle weight limitations applicable to other State highways shall be applicable in lieu of the requirements under this subsection.  
(B) With respect to all portions of the Interstate Highway System in the State of Vermont, laws (including regulations) of that State concerning vehicle weight limitations applicable to other State highways shall be applicable in lieu of the requirements under this subsection.
- (12) Heavy duty vehicles.—
  - (A) In general.—Subject to subparagraphs (B) and (C), in order to promote reduction of fuel use and emissions because of engine idling, the maximum gross vehicle weight limit and the axle weight limit for any heavy-duty vehicle equipped with an idle reduction technology shall be increased by a quantity necessary to compensate for the additional weight of the idle reduction system.

- (B) Maximum weight increase.—The weight increase under subparagraph (A) shall be not greater than 550 pounds.
  - (C) Proof.—On request by a regulatory agency or law enforcement agency, the vehicle operator shall provide proof (through demonstration or certification) that—
    - (i) the idle reduction technology is fully functional at all times; and
    - (ii) the 550-pound gross weight increase is not used for any purpose other than the use of idle reduction technology described in subparagraph (A).
- (13) Milk products.—A vehicle carrying fluid milk products shall be considered a load that cannot be easily dismantled or divided.
- (b) Reasonable Access.—No State may enact or enforce any law denying reasonable access to motor vehicles subject to this title to and from the Interstate Highway System to terminals and facilities for food, fuel, repairs, and rest.
  - (c) Ocean Transport Container Defined.—For purposes of this section, the term "ocean transport container" has the meaning given the term "freight container" by the International Standards Organization in Series 1, Freight Containers, 3rd Edition (reference number IS0668–1979(E)) as in effect on the date of the enactment of this subsection.
  - (d) Longer Combination Vehicles.—
    - (1) Prohibition.—
      - (A) General continuation rule.—A longer combination vehicle may continue to operate only if the longer combination vehicle configuration type was authorized by State officials pursuant to State statute or regulation conforming to this section and in actual lawful operation on a regular or periodic basis (including seasonal operations) on or before June 1, 1991, or pursuant to section 335 of the Department of Transportation and Related Agencies Appropriations Act, 1991 (104 Stat. 2186).
      - (B) Applicability of state laws and regulations.—All such operations shall continue to be subject to, at the minimum, all State statutes, regulations, limitations and conditions, including, but not limited to, routing-specific and configuration-specific designations and all other restrictions, in force on June 1, 1991; except that subject to such regulations as may be issued by the Secretary pursuant to paragraph (5) of this subsection, the State may make minor adjustments of a temporary and emergency nature to route designations and vehicle operating restrictions in effect on June 1, 1991, for specific safety purposes and road construction.
      - (C) Wyoming.—In addition to those vehicles allowed under subparagraph (A), the State of Wyoming may allow the operation of additional vehicle configurations not in actual operation on June 1, 1991, but authorized by State law not later than November 3, 1992, if such vehicle configurations comply with the single axle, tandem axle, and bridge formula limits set forth in subsection (a) and do not exceed 117,000 pounds gross vehicle weight.
      - (D) Ohio.—In addition to vehicles which the State of Ohio may continue to allow to be operated under subparagraph (A), such State may allow longer combination vehicles with 3 cargo carrying units of

28½ feet each (not including the truck tractor) not in actual operation on June 1, 1991, to be operated within its boundaries on the 1-mile segment of Ohio State Route 7 which begins at and is south of exit 16 of the Ohio Turnpike.

(E) Alaska.—In addition to vehicles which the State of Alaska may continue to allow to be operated under subparagraph (A), such State may allow the operation of longer combination vehicles which were not in actual operation on June 1, 1991, but which were in actual operation prior to July 5, 1991.

(F) Iowa.—In addition to vehicles that the State of Iowa may continue to allow to be operated under subparagraph (A), the State may allow longer combination vehicles that were not in actual operation on June 1, 1991, to be operated on Interstate Route 29 between Sioux City, Iowa, and the border between Iowa and South Dakota or Interstate Route 129 between Sioux City, Iowa, and the border between Iowa and Nebraska.

(2) Additional state restrictions.—

(A) In general.—Nothing in this subsection shall prevent any State from further restricting in any manner or prohibiting the operation of longer combination vehicles otherwise authorized under this subsection; except that such restrictions or prohibitions shall be consistent with the requirements of sections 31111–31114 of title 49.

(B) Minor adjustments.—Any State further restricting or prohibiting the operations of longer combination vehicles or making minor adjustments of a temporary and emergency nature as may be allowed pursuant to regulations issued by the Secretary pursuant to paragraph (5) of this subsection, shall, within 30 days, advise the Secretary of such action, and the Secretary shall publish a notice of such action in the Federal Register.

(3) Publication of list.—

(A) Submission to secretary.—Within 60 days of the date of the enactment of this subsection, each State (i) shall submit to the Secretary for publication in the Federal Register a complete list of (I) all operations of longer combination vehicles being conducted as of June 1, 1991, pursuant to State statutes and regulations; (II) all limitations and conditions, including, but not limited to, routing-specific and configuration-specific designations and all other restrictions, governing the operation of longer combination vehicles otherwise prohibited under this subsection; and (III) such statutes, regulations, limitations, and conditions; and (ii) shall submit to the Secretary copies of such statutes, regulations, limitations, and conditions.

(B) Interim list.—Not later than 90 days after the date of the enactment of this subsection, the Secretary shall publish an interim list in the Federal Register, consisting of all information submitted pursuant to subparagraph (A). The Secretary shall review for accuracy all information submitted by the States pursuant to subparagraph (A) and shall solicit and consider public comment on the accuracy of all such information.

(C) Limitation.—No statute or regulation shall be included on the list submitted by a State or published by the Secretary merely on the grounds that it authorized, or could have authorized, by permit or

otherwise, the operation of longer combination vehicles, not in actual operation on a regular or periodic basis on or before June 1, 1991.

- (D) Final list.—Except as modified pursuant to paragraph (1)(C) of this subsection, the list shall be published as final in the Federal Register not later than 180 days after the date of the enactment of this subsection. In publishing the final list, the Secretary shall make any revisions necessary to correct inaccuracies identified under subparagraph (B). After publication of the final list, longer combination vehicles may not operate on the Interstate System except as provided in the list.
  - (E) Review and correction procedure.—The Secretary, on his or her own motion or upon a request by any person (including a State), shall review the list issued by the Secretary pursuant to subparagraph (D). If the Secretary determines there is cause to believe that a mistake was made in the accuracy of the final list, the Secretary shall commence a proceeding to determine whether the list published pursuant to subparagraph (D) should be corrected. If the Secretary determines that there is a mistake in the accuracy of the list the Secretary shall correct the publication under subparagraph (D) to reflect the determination of the Secretary.
- (4) Longer combination vehicle defined.—For purposes of this section, the term "longer combination vehicle" means any combination of a truck tractor and 2 or more trailers or semitrailers which operates on the Interstate System at a gross vehicle weight greater than 80,000 pounds.
  - (5) Regulations regarding minor adjustments.—Not later than 180 days after the date of the enactment of this subsection, the Secretary shall issue regulations establishing criteria for the States to follow in making minor adjustments under paragraph (1)(B).
- (e) Operation of Certain Specialized Hauling Vehicles on Interstate Route 68.—The single axle, tandem axle, and bridge formula limits set forth in subsection (a) shall not apply to the operation on Interstate Route 68 in Garrett and Allegany Counties, Maryland, of any specialized vehicle equipped with a steering axle and a tridem axle and used for hauling coal, logs, and pulpwood if such vehicle is of a type of vehicle as was operating in such counties on United States Route 40 or 48 for such purpose on August 1, 1991.
  - (f) Operation of Certain Specialized Hauling Vehicles on Certain Wisconsin Highways.—If the 104-mile portion of Wisconsin State Route 78 and United States Route 51 between Interstate Route 94 near Portage, Wisconsin, and Wisconsin State Route 29 south of Wausau, Wisconsin, is designated as part of the Interstate System under section 103(c)(4)(A), the single axle weight, tandem axle weight, gross vehicle weight, and bridge formula limits set forth in subsection (a) shall not apply to the 104-mile portion with respect to the operation of any vehicle that could legally operate on the 104-mile portion before the date of the enactment of this subsection.
  - (g) Operation of Certain Specialized Hauling Vehicles on Certain Pennsylvania Highways.—If the segment of United States Route 220 between Bedford and Bald Eagle, Pennsylvania, is designated as part of the Interstate System, the single axle weight, tandem axle weight, gross vehicle weight, and bridge formula limits set forth in subsection (a) shall not apply to that segment with respect to the operation of any vehicle which could have legally operated on that segment before the date of the enactment of this subsection.
  - (h) Waiver for a Route in State of Maine During Periods of National Emergency.—

- (1) In general.—Notwithstanding any other provision of this section, the Secretary, in consultation with the Secretary of Defense, may waive or limit the application of any vehicle weight limit established under this section with respect to the portion of Interstate Route 95 in the State of Maine between Augusta and Bangor for the purpose of making bulk shipments of jet fuel to the Air National Guard Base at Bangor International Airport during a period of national emergency in order to respond to the effects of the national emergency.
  - (2) Applicability.—Emergency limits established under paragraph (1) shall preempt any inconsistent State vehicle weight limits.
- (i) Special Permits During Periods of National Emergency.—
- (1) In general.—Notwithstanding any other provision of this section, a State may issue special permits during an emergency to overweight vehicles and loads that can easily be dismantled or divided if—
    - (A) the President has declared the emergency to be a major disaster under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.);
    - (B) the permits are issued in accordance with State law; and
    - (C) the permits are issued exclusively to vehicles and loads that are delivering relief supplies.
  - (2) Expiration.—A permit issued under paragraph (1) shall expire not later than 120 days after the date of the declaration of emergency under subparagraph (A) of that paragraph.
- (j) Operation of Vehicles on Certain Other Wisconsin Highways.—If any segment of the United States Route 41 corridor, as described in section 1105(c)(57) of the Intermodal Surface Transportation Efficiency Act of 1991, is designated as a route on the Interstate System, a vehicle that could operate legally on that segment before the date of such designation may continue to operate on that segment, without regard to any requirement under subsection (a).
- (k) Operation of Vehicles on Certain Mississippi Highways.—If any segment of United States Route 78 in Mississippi from mile marker 0 to mile marker 113 is designated as part of the Interstate System, no limit established under this section may apply to that segment with respect to the operation of any vehicle that could have legally operated on that segment before such designation.
- (l) Operation of Vehicles on Certain Kentucky Highways.—
- (1) In general.—If any segment of highway described in paragraph (2) is designated as a route on the Interstate System, a vehicle that could operate legally on that segment before the date of such designation may continue to operate on that segment, without regard to any requirement under subsection (a).
  - (2) Description of highway segments.—The highway segments referred to in paragraph (1) are as follows:
    - (A) Interstate Route 69 in Kentucky (formerly the Wendell H. Ford (Western Kentucky) Parkway) from the Interstate Route 24 Interchange, near Eddyville, to the Edward T. Breathitt (Pennyrile) Parkway Interchange.
    - (B) The Edward T. Breathitt (Pennyrile) Parkway (to be designated as Interstate Route 69) in Kentucky from the Wendell H. Ford (Western Kentucky) Parkway Interchange to near milepost 77, and on new

alignment to an interchange on the Audubon Parkway, if the segment is designated as part of the Interstate System.

(m) Covered Heavy-duty Tow and Recovery Vehicles.—

- (1) In general.—The vehicle weight limitations set forth in this section do not apply to a covered heavy-duty tow and recovery vehicle.
- (2) Covered heavy-duty tow and recovery vehicle defined.—In this subsection, the term "covered heavy-duty tow and recovery vehicle" means a vehicle that—
  - (A) is transporting a disabled vehicle from the place where the vehicle became disabled to the nearest appropriate repair facility; and
  - (B) has a gross vehicle weight that is equal to or exceeds the gross vehicle weight of the disabled vehicle being transported.

(n) Operation of Vehicles on Certain Highways in the State of Texas.—If any segment in the State of Texas of United States Route 59, United States Route 77, United States Route 281, United States Route 84, Texas State Highway 44, or another roadway is designated as Interstate Route 69, a vehicle that could operate legally on that segment before the date of the designation may continue to operate on that segment, without regard to any requirement under this section.

(o) Certain Logging Vehicles in the State of Wisconsin.—

- (1) In general.—The Secretary shall waive, with respect to a covered logging vehicle, the application of any vehicle weight limit established under this section.
- (2) Covered logging vehicle defined.—In this subsection, the term "covered logging vehicle" means a vehicle that—
  - (A) is transporting raw or unfinished forest products, including logs, pulpwood, biomass, or wood chips;
  - (B) has a gross vehicle weight of not more than 98,000 pounds;
  - (C) has not less than 6 axles; and
  - (D) is operating on a segment of Interstate Route 39 in the State of Wisconsin from mile marker 175.8 to mile marker 189.

(p) Operation of Certain Specialized Vehicles on Certain Highways in the State of Arkansas.—If any segment of United States Route 63 between the exits for highways 14 and 75 in the State of Arkansas is designated as part of the Interstate System, the single axle weight, tandem axle weight, gross vehicle weight, and bridge formula limits under subsection (a) and the width limitation under section 31113(a) of title 49 shall not apply to that segment with respect to the operation of any vehicle that could operate legally on that segment before the date of the designation.

(q) Certain Logging Vehicles in the State of Minnesota.—

- (1) In general.—The Secretary shall waive, with respect to a covered logging vehicle, the application of any vehicle weight limit established under this section.
- (2) Covered logging vehicle defined.—In this subsection, the term "covered logging vehicle" means a vehicle that—

- (A) is transporting raw or unfinished forest products, including logs, pulpwood, biomass, or wood chips;
  - (B) has a gross vehicle weight of not more than 99,000 pounds;
  - (C) has not less than 6 axles; and
  - (D) is operating on a segment of Interstate Route 35 in the State of Minnesota from mile marker 235.4 to mile marker 259.552.
- (r) Emergency Vehicles.—
- (1) In general.—Notwithstanding subsection (a), a State shall not enforce against an emergency vehicle a vehicle weight limit (up to a maximum gross vehicle weight of 86,000 pounds) of less than—
    - (A) 24,000 pounds on a single steering axle;
    - (B) 33,500 pounds on a single drive axle;
    - (C) 62,000 pounds on a tandem axle; or
    - (D) 52,000 pounds on a tandem rear drive steer axle.
  - (2) Emergency vehicle defined.—In this subsection, the term "emergency vehicle" means a vehicle designed to be used under emergency conditions—
    - (A) to transport personnel and equipment; and
    - (B) to support the suppression of fires and mitigation of other hazardous situations.
- (s) NATURAL GAS AND ELECTRIC BATTERY VEHICLES.—A vehicle, if operated by an engine fueled primarily by natural gas or powered primarily by means of electric battery power, may exceed the weight limit on the power unit by up to 2,000 pounds (up to a maximum gross vehicle weight of 82,000 pounds) under this section.
- (t) Vehicles in Idaho.—A vehicle limited or prohibited under this section from operating on a segment of the Interstate System in the State of Idaho may operate on such a segment if such vehicle—
- (1) has a gross vehicle weight of 129,000 pounds or less;
  - (2) other than gross vehicle weight, complies with the single axle, tandem axle, and bridge formula limits set forth in subsection (a); and
  - (3) is authorized to operate on such segment under Idaho State law.
- (u) VEHICLES IN NORTH DAKOTA.—A vehicle limited or prohibited under this section from operating on a segment of the Interstate System in the State of North Dakota may operate on such a segment if such vehicle—
- (1) has a gross vehicle weight of 129,000 pounds or less;
  - (2) other than gross vehicle weight, complies with the single axle, tandem axle, and bridge formula limits set forth in subsection (a); and
  - (3) is authorized to operate on such segment under North Dakota State law.
- (v) OPERATION OF VEHICLES ON CERTAIN NORTH CAROLINA HIGHWAYS.—If any segment in the State of North Carolina of United States Route 17, United States Route 29, United States Route 52, United States Route 64, United States Route 70, United States Route 74, United States Route 117, United States Route 220, United States Route 264, or United States Route 421 is designated as a route on the Interstate System, a

vehicle that could operate legally on that segment before the date of such designation may continue to operate on that segment, without regard to any requirement under subsection (a).

- (w) OPERATION OF VEHICLES ON CERTAIN OKLAHOMA HIGHWAYS.—If any segment of the highway referred to in paragraph (96) of section 1105(c) of the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102–240; 105 Stat. 2032) is designated as a route on the Interstate System, a vehicle that could operate legally on that segment before the date of such designation may continue to operate on that segment, without any regard to any requirement under this section.

#### **49 U.S.C. § 31141. Review and Preemption of State Laws and Regulations**

- (a) Preemption After Decision.—A State may not enforce a State law or regulation on commercial motor vehicle safety that the Secretary of Transportation decides under this section may not be enforced.
- (b) Submission of Regulation.—A State receiving funds made available under section 31104 that enacts a State law or issues a regulation on commercial motor vehicle safety shall submit a copy of the law or regulation to the Secretary immediately after the enactment or issuance.
- (c) Review and Decisions by Secretary.—
- (1) Review.—The Secretary shall review State laws and regulations on commercial motor vehicle safety. The Secretary shall decide whether the State law or regulation—
    - (A) has the same effect as a regulation prescribed by the Secretary under section 31136;
    - (B) is less stringent than such regulation; or
    - (C) is additional to or more stringent than such regulation.
  - (2) Regulations with same effect.—If the Secretary decides a State law or regulation has the same effect as a regulation prescribed by the Secretary under section 31136 of this title, the State law or regulation may be enforced.
  - (3) Less stringent regulations.—If the Secretary decides a State law or regulation is less stringent than a regulation prescribed by the Secretary under section 31136 of this title, the State law or regulation may not be enforced.
  - (4) Additional or more stringent regulations.—If the Secretary decides a State law or regulation is additional to or more stringent than a regulation prescribed by the Secretary under section 31136 of this title, the State law or regulation may be enforced unless the Secretary also decides that—
    - (A) the State law or regulation has no safety benefit;
    - (B) the State law or regulation is incompatible with the regulation prescribed by the Secretary; or
    - (C) enforcement of the State law or regulation would cause an unreasonable burden on interstate commerce.
  - (5) Consideration of effect on interstate commerce.—In deciding under paragraph (4) whether a State law or regulation will cause an unreasonable burden on interstate commerce, the Secretary may consider the effect on interstate commerce of implementation of that law or regulation with the implementation of all similar laws and regulations of other States.



- (d) Waivers.—
- (1) A person (including a State) may petition the Secretary for a waiver of a decision of the Secretary that a State law or regulation may not be enforced under this section. The Secretary shall grant the waiver, as expeditiously as possible, if the person demonstrates to the satisfaction of the Secretary that the waiver is consistent with the public interest and the safe operation of commercial motor vehicles.
  - (2) Before deciding whether to grant or deny a petition for a waiver under this subsection, the Secretary shall give the petitioner an opportunity for a hearing on the record.
- (e) Written Notice of Decisions.—Not later than 10 days after making a decision under subsection (c) of this section that a State law or regulation may not be enforced, the Secretary shall give written notice to the State of that decision.
- (f) Judicial Review and Venue.—
- (1) Not later than 60 days after the Secretary makes a decision under subsection (c) of this section, or grants or denies a petition for a waiver under subsection (d) of this section, a person (including a State) adversely affected by the decision, grant, or denial may file a petition for judicial review. The petition may be filed in the court of appeals of the United States for the District of Columbia Circuit or in the court of appeals of the United States for the circuit in which the person resides or has its principal place of business.
  - (2) The court has jurisdiction to review the decision, grant, or denial and to grant appropriate relief, including interim relief, as provided in chapter 7 of title 5.
  - (3) A judgment of a court under this subsection may be reviewed only by the Supreme Court under section 1254 of title 28.
  - (4) The remedies provided for in this subsection are in addition to other remedies provided by law.
- (g) Initiating Review Proceedings.—To review a State law or regulation on commercial motor vehicle safety under this section, the Secretary may initiate a regulatory proceeding on the Secretary's own initiative or on petition of an interested person (including a State).

## **Definitions**

### **A.R.S. § 1-242. Standard time.**

- A. The standard time in Arizona shall be the solar time of the one hundred fifth meridian west of Greenwich, commonly known as standard mountain time.
- B. This section shall not be construed to affect the standard time established by United States law governing the movements of common carriers engaged in interstate commerce or the time for performance of an act by an officer or department of the United States, as established by a statute, lawful order, rule or regulation of the United States or an agency thereof.
- C. Notwithstanding any other provision of law to the contrary by the United States government relating to adoption of daylight saving time by all of the states, the state of Arizona elects to reject such time and elects to continue in force the terms of subsection A, relating to standard time in Arizona.
- D. The rejection of daylight saving time as provided for in this section may be changed by future legislative action.

### **A.R.S. § 1-301. Holidays enumerated.**

- A. The following days shall be holidays:
  - 1. Sunday of each week.
  - 2. January 1, "New Year's Day".
  - 3. Third Monday in January, "Martin Luther King, Jr./Civil Rights Day".
  - 4. Third Monday in February, "Lincoln/Washington Presidents' Day".
  - 5. Second Sunday in May, "Mothers' Day".
  - 6. Last Monday in May, "Memorial Day".
  - 7. June 2, "Native American Day".
  - 8. Third Sunday in June, "Fathers' Day".
  - 9. July 4, "Independence Day".
  - 10. First Sunday in August, "American Family Day".
  - 11. August 14, "National Navajo Code Talkers Day".
  - 12. First Monday in September, "Labor Day".
  - 13. September 17, "Constitution Commemoration Day".
  - 14. Second Monday in October, "Columbus Day".
  - 15. November 11, "Veterans' Day".
  - 16. Fourth Thursday in November, "Thanksgiving Day".
  - 17. December 25, "Christmas Day".
- B. When any of the holidays enumerated in subsection A of this section falls on a Sunday, the following Monday shall be observed as a holiday, with the exception of the holidays enumerated in subsection A, paragraphs 1, 5, 7, 8, 10, 11 and 13 of this section.
- C. When any of the holidays enumerated in subsection A, paragraphs 2, 9, 15 and 17 of this section falls on a Saturday, the preceding Friday shall be observed as a holiday.

- D. When the holiday enumerated in subsection A, paragraph 7 of this section falls on a day other than Sunday, the Sunday following June 2 shall be observed as that holiday.
- E. When the holiday enumerated in subsection A, paragraph 11 of this section falls on a day other than Sunday, the Sunday following August 14 shall be observed as that holiday.
- F. When the holiday enumerated in subsection A, paragraph 13 of this section falls on a day other than Sunday, the Sunday preceding September 17 shall be observed as that holiday.

**A.R.S. § 3-3401. Definitions.**

In this chapter, unless the context otherwise requires:

1. "Area A" has the same meaning prescribed in section 49-541.
2. "Area B" has the same meaning prescribed in section 49-541.
3. "Area C" means that portion of Pinal county lying west of range 11 east, excluding that portion of the county lying within area A as defined in section 49-541 and that portion of the county within the jurisdiction of any Indian tribe, band, group or community that is recognized by the United States secretary of the interior and that exercises governmental authority within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent and including rights-of-way running through the reservation.
4. "Associate director" means the associate director of the division.
5. "Biodiesel" means a mono-alkyl ester that meets ASTM D6751.
6. "Biodiesel blend" means a motor fuel that is composed of biodiesel and diesel fuel and that is designated by the letter "B", followed by the numeric value of the volume percentage of biodiesel in the blend.
7. "Biofuel" means a solid, liquid or gaseous fuel that is derived from biomass and that can be used directly for heating or power or as a blend component in motor fuel.
8. "Biofuel blend" means a motor fuel that is composed of a biofuel, that is combined with a petroleum-based fuel and that is designated by the volume percentage of biofuel in the blend.
9. "Biomass" means biological material, such as plant or animal matter, excluding organic material that has been transformed by geological processes into substances such as coal or petroleum or derivatives thereof, that may be transformed into biofuel.
10. "Biomass-based diesel" means a diesel fuel substitute produced from nonpetroleum renewable resources that meets the registration requirements for fuels and fuel additives established by the United States environmental protection agency under 42 United States Code 7545 and includes fuel derived from animal wastes, including poultry wastes and other waste materials, municipal solid waste and sludge and oil derived from wastewater and the treatment of wastewater. Biomass-based diesel does not include biodiesel.
11. "Biomass-based diesel blend" means a blend of petroleum-based diesel fuel with biomass-based diesel.
12. "Certification" means the process of determining the accuracy of a commercial device to the standards of this state by a registered service representative or the division.

13. "Commercial device" means any weighing, measuring, metering or counting device that is used to determine the direct cost of things sold or offered or exposed for sale, or used to establish a fee for service if the cost is based on weight, measure or count, except that it does not include those devices used for in-house packaging, inventory control or law enforcement purposes.
14. "Commodity" means any merchandise, product or substance produced or distributed for sale to or use by others.
15. "Correct" as used in connection with weights and measures means conformance to all applicable requirements of this chapter.
16. "Diesel fuel" means a refined middle distillate that is used as a fuel in a compression-ignition internal combustion engine and that meets the specifications of ASTM D975.
17. "Division" means the weights and measures services division of the department.
18. "Ethanol flex fuel" means a fuel ethanol gasoline blend that meets the specifications of ASTM D5798 standard specification for ethanol fuel blends for flexible-fuel automotive spark-ignition engines.
19. "Fleet owner" means a registered owner or lessee of at least twenty-five vehicles.
20. "Gasoline" means a volatile, highly flammable liquid mixture of hydrocarbons that does not contain more than five one-hundredths grams of lead for each United States gallon, that is produced, refined, manufactured, blended, distilled or compounded from petroleum, natural gas, oil, shale oils or coal and other flammable liquids free from undissolved water, sediment or suspended matter, with or without additives, and that is commonly used as a fuel for spark-ignition internal combustion engines. Gasoline does not include diesel fuel or ethanol flex fuel.
21. "Gasoline provider" means any manufacturer of gasoline or any person who imports gasoline into a vehicle emissions control area by means of a pipeline or in truckload quantities for the person's own use within the vehicle emissions control area or any person who sells gasoline intended for ultimate consumption within a vehicle emissions control area. Gasoline provider does not mean a person with respect to a gasoline supplied or sold by the person to another person for resale to a retailer within a vehicle emissions control area or to a fleet owner for consumption within a vehicle emissions control area.
22. "Inspector" means a state official of the division.
23. "Liquid measuring device" means any meter, pump, tank, gauge or apparatus used for volumetrically determining the quantity of any internal combustion engine fuel, liquefied petroleum gas or low viscosity heating oil.
24. "Manufacturer's proving ground" means a facility whose sole purpose is to develop complete advanced vehicles for an automotive manufacturer.
25. "Misfuel" means the act of dispensing into the fuel tank of a motor vehicle a motor fuel that was not intended to be used in the engine of that motor vehicle.
26. "Motor fuel" means a petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, number one or number two diesel fuel or any grade of oxygenated gasoline typically used in the operation of a motor engine, including biodiesel blends, biofuel blends and ethanol flex fuels.

27. "Motor vehicle racing event" means a race that uses unlicensed vehicles designed and manufactured specifically for racing purposes and that is conducted on a public or private racecourse for the entertainment of the general public. Motor vehicle racing event includes practice, qualifying and demonstration laps conducted as part of the activities related to a motor vehicle race.
28. "Oxygenate" means any oxygen-containing ashless, organic compound, including aliphatic alcohols and aliphatic ethers, that may be used as a fuel or as a gasoline blending component and that is approved as a blending agent under the provisions of a waiver issued by the United States environmental protection agency pursuant to 42 United States Code section 7545(f).
29. "Oxygenated fuel" means an unleaded motor fuel blend that consists primarily of gasoline and at least one and one-half percent by weight of one or more oxygenates and that has been blended consistent with the provisions of a waiver issued by the United States environmental protection agency pursuant to 42 United States Code section 7545(f).
30. "Package" means any commodity enclosed in a container or wrapped in any manner in advance of sale in units suitable for either wholesale or retail trade.
31. "Person" means both the plural and the singular, as the case demands, and includes individuals, partnerships, corporations, companies, societies and associations.
32. "Product transfer document" means any bill of lading, loading ticket, manifest, delivery receipt, invoice or other documentation used on any occasion when a person transfers custody or title of motor fuel other than when motor fuel is sold or dispensed at a service station or fleet vehicle fueling facility.
33. "Public weighmaster" means any person who is engaged in any of the following:
  - (a) The business of weighing any object or thing for the public generally for hire or for internal use and issuing for that weighing a weight certificate intended to be accepted as an accurate weight on which a purchase or sale is to be based or on which a service fee is to be charged.
  - (b) The business of weighing for-hire motor vehicles, trailers or semitrailers and issuing weight certificates intended to be accepted as an accurate weight for the purpose of determining the amount of any tax, fee or other assessment on the vehicles.
34. "Reference standards" means the physical standards of the state that serve as the legal reference from which all other standards and weights and measures are derived.
35. "Registered service agency" means any agency, firm, company or corporation that for hire, award, commission or any other payment of any kind installs, services, repairs or reconditions a commercial device or tests or repairs vapor recovery systems or vapor recovery components and that has been issued a license by the division.
36. "Registered service representative" means any individual who for hire, award, commission or any other payment of any kind installs, services, repairs or reconditions a commercial device or tests or repairs vapor recovery systems or vapor recovery components and who has been issued a license by the division.
37. "Retail seller" means a person whose business purpose is to sell, expose or offer for sale or use any package or commodity by weight, measure or count.

38. "Secondary standards" means the physical standards that are traceable to the reference standards through comparisons, using acceptable laboratory procedures, and that are used in the enforcement of weights and measures laws and rules.
39. "Supplier" means any person that imports gasoline into a vehicle emissions control area by means of a pipeline or in truckload quantities for the person's own use within the vehicle emissions control area or any person that sells gasoline intended for ultimate consumption within a vehicle emissions control area, except that supplier does not mean a person with respect to gasoline supplied or sold by the person to another for resale to a retailer within a vehicle emissions control area or to a fleet owner for consumption within a vehicle emissions control area.
40. "Vehicle emissions control area" means a county with a population of one million two hundred thousand or more persons and any portion of a county contained in area A, or any portion of area B or C, except that such an area does not include a manufacturer's proving ground that is located in the vehicle emissions control area.
41. "Weight" as used in connection with any commodity means net weight.
42. "Weights" or "measures", or both, means all weights, measures, meters or counters of every kind, instruments and devices for weighing, measuring, metering or counting and any appliance and accessories associated with any or all such instruments and devices.

**A.R.S. § 28-101. Definitions.**

In this title, unless the context otherwise requires:

1. "Alcohol" means any substance containing any form of alcohol, including ethanol, methanol, propynol and isopropynol.
2. "Alcohol concentration" if expressed as a percentage means either:
  - (a) The number of grams of alcohol per one hundred milliliters of blood.
  - (b) The number of grams of alcohol per two hundred ten liters of breath.
3. "All-terrain vehicle" means either of the following:
  - (a) A motor vehicle that satisfies all of the following:
    - (i) Is designed primarily for recreational nonhighway all-terrain travel.
    - (ii) Is fifty or fewer inches in width.
    - (iii) Has an unladen weight of one thousand two hundred pounds or less.
    - (iv) Travels on three or more nonhighway tires.
    - (v) Is operated on a public highway.
  - (b) A recreational off-highway vehicle that satisfies all of the following:
    - (i) Is designed primarily for recreational nonhighway all-terrain travel.
    - (ii) Is eighty or fewer inches in width.
    - (iii) Has an unladen weight of two thousand five hundred pounds or less.
    - (iv) Travels on four or more nonhighway tires.

- (v) Has a steering wheel for steering control.
  - (vi) Has a rollover protective structure.
  - (vii) Has an occupant retention system.
4. “Authorized emergency vehicle” means any of the following:
    - (a) A fire department vehicle.
    - (b) A police vehicle.
    - (c) An ambulance or emergency vehicle of a municipal department or public service corporation that is designated or authorized by the department or a local authority.
    - (d) Any other ambulance, fire truck or rescue vehicle that is authorized by the department in its sole discretion and that meets liability insurance requirements prescribed by the department.
  5. “Autocycle” means a three-wheeled motorcycle on which the driver and passengers ride in a fully or partially enclosed seating area that is equipped with a roll cage, safety belts for each occupant and antilock brakes and that is designed to be controlled with a steering wheel and pedals.
  6. “Automated driving system” means the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis, regardless of whether it is limited to a specific operational design domain.
  7. “Automotive recycler” means a person that is engaged in the business of buying or acquiring a motor vehicle solely for the purpose of dismantling, selling or otherwise disposing of the parts or accessories and that removes parts for resale from six or more vehicles in a calendar year.
  8. “Autonomous vehicle” means a motor vehicle that is equipped with an automated driving system.
  9. “Aviation fuel” means all flammable liquids composed of a mixture of selected hydrocarbons expressly manufactured and blended for the purpose of effectively and efficiently operating an internal combustion engine for use in an aircraft but does not include fuel for jet or turbine powered aircraft.
  10. “Bicycle” means a device, including a racing wheelchair, that is propelled by human power and on which a person may ride and that has either:
    - (a) Two tandem wheels, either of which is more than sixteen inches in diameter.
    - (b) Three wheels in contact with the ground, any of which is more than sixteen inches in diameter.
  11. “Board” means the transportation board.
  12. “Bus” means a motor vehicle designed for carrying sixteen or more passengers, including the driver.
  13. “Business district” means the territory contiguous to and including a highway if there are buildings in use for business or industrial purposes within any six hundred feet along the highway, including hotels, banks or office buildings, railroad stations and public buildings that occupy at least three hundred feet of frontage on one side or three hundred feet collectively on both sides of the highway.
  14. “Certificate of ownership” means a paper or an electronic record that is issued in another state or a foreign jurisdiction and that indicates ownership of a vehicle.
  15. “Certificate of title” means a paper document or an electronic record that is issued by the department and that indicates ownership of a vehicle.

16. "Combination of vehicles" means a truck or truck tractor and semitrailer and any trailer that it tows but does not include a forklift designed for the purpose of loading or unloading the truck, trailer or semitrailer.
17. "Controlled substance" means a substance so classified under section 102(6) of the controlled substances act (21 United States Code section 802(6)) and includes all substances listed in schedules I through V of 21 Code of Federal Regulations part 1308.
18. "Conviction" means:
  - (a) An unvacated adjudication of guilt or a determination that a person violated or failed to comply with the law in a court of original jurisdiction or by an authorized administrative tribunal.
  - (b) An unvacated forfeiture of bail or collateral deposited to secure the person's appearance in court.
  - (c) A plea of guilty or no contest accepted by the court.
  - (d) The payment of a fine or court costs.
19. "County highway" means a public road that is constructed and maintained by a county.
20. "Dealer" means a person who is engaged in the business of buying, selling or exchanging motor vehicles, trailers or semitrailers and who has an established place of business and has paid fees pursuant to section 28-4302.
21. "Department" means the department of transportation acting directly or through its duly authorized officers and agents.
22. "Digital network or software application" has the same meaning prescribed in section 28-9551.
23. "Director" means the director of the department of transportation.
24. "Drive" means to operate or be in actual physical control of a motor vehicle.
25. "Driver" means a person who drives or is in actual physical control of a vehicle.
26. "Driver license" means a license that is issued by a state to an individual and that authorizes the individual to drive a motor vehicle.
27. "Dynamic driving task":
  - (a) Means all of the real-time operational and tactical functions required to operate a vehicle in on-road traffic.
  - (b) Includes:
    - (i) Lateral vehicle motion control by steering.
    - (ii) Longitudinal motion control by acceleration and deceleration.
    - (iii) Monitoring the driving environment by object and event detection, recognition, classification and response preparation.
    - (iv) Object and event response execution.
    - (v) Maneuver planning.
    - (vi) Enhancing conspicuity by lighting, signaling and gesturing.
  - (c) Does not include strategic functions such as trip scheduling and selecting destinations and waypoints.



28. “Electric bicycle” means a bicycle or tricycle that is equipped with fully operable pedals and an electric motor of less than seven hundred fifty watts and that meets the requirements of one of the following classes:
- (a) “Class 1 electric bicycle” means a bicycle or tricycle that is equipped with an electric motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the bicycle or tricycle reaches the speed of twenty miles per hour.
  - (b) “Class 2 electric bicycle” means a bicycle or tricycle that is equipped with an electric motor that may be used exclusively to propel the bicycle or tricycle and that is not capable of providing assistance when the bicycle or tricycle reaches the speed of twenty miles per hour.
  - (c) “Class 3 electric bicycle” means a bicycle or tricycle that is equipped with an electric motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the bicycle or tricycle reaches the speed of twenty-eight miles per hour.
29. “Electric miniature scooter” means a device that:
- (a) Weighs less than thirty pounds.
  - (b) Has two or three wheels.
  - (c) Has handlebars.
  - (d) Has a floorboard on which a person may stand while riding.
  - (e) Is powered by an electric motor or human power, or both.
  - (f) Has a maximum speed that does not exceed ten miles per hour, with or without human propulsion, on a paved level surface.
30. “Electric personal assistive mobility device” means a self-balancing device with one wheel or two nontandem wheels and an electric propulsion system that limits the maximum speed of the device to fifteen miles per hour or less and that is designed to transport only one person.
31. “Electric standup scooter”:
- (a) Means a device that:
    - (i) Weighs less than seventy-five pounds.
    - (ii) Has two or three wheels.
    - (iii) Has handlebars.
    - (iv) Has a floorboard on which a person may stand while riding.
    - (v) Is powered by an electric motor or human power, or both.
    - (vi) Has a maximum speed that does not exceed twenty miles per hour, with or without human propulsion, on a paved level surface.
  - (b) Does not include an electric miniature scooter.
32. “Evidence” includes both of the following:
- (a) A display on a wireless communication device of a department-generated driver license, nonoperating identification license, vehicle registration card or other official record of the department that is presented to a law enforcement officer or in a court or an administrative proceeding.

- (b) An electronic or digital license plate authorized pursuant to section 28-364.
33. “Farm” means any lands primarily used for agriculture production.
34. “Farm tractor” means a motor vehicle designed and used primarily as a farm implement for drawing implements of husbandry.
35. “Foreign vehicle” means a motor vehicle, trailer or semitrailer that is brought into this state other than in the ordinary course of business by or through a manufacturer or dealer and that has not been registered in this state.
36. “Fully autonomous vehicle” means an autonomous vehicle that is equipped with an automated driving system designed to function as a level four or five system under SAE J3016 and that may be designed to function either:
- (a) Solely by use of the automated driving system.
  - (b) By a human driver when the automated driving system is not engaged.
37. “Golf cart” means a motor vehicle that has not less than three wheels in contact with the ground, that has an unladen weight of less than one thousand eight hundred pounds, that is designed to be and is operated at not more than twenty-five miles per hour and that is designed to carry not more than four persons including the driver.
38. “Hazardous material” means a material, and its mixtures or solutions, that the United States department of transportation determines under 49 Code of Federal Regulations is, or any quantity of a material listed as a select agent or toxin under 42 Code of Federal Regulations part 73 that is, capable of posing an unreasonable risk to health, safety and property if transported in commerce and that is required to be placarded or marked as required by the department’s safety rules prescribed pursuant to chapter 14 of this title.
39. “Human driver” means a natural person in the vehicle who performs in real time all or part of the dynamic driving task or who achieves a minimal risk condition for the vehicle.
40. “Implement of husbandry” means a vehicle that is designed primarily for agricultural purposes and that is used exclusively in the conduct of agricultural operations, including an implement or vehicle whether self-propelled or otherwise that meets both of the following conditions:
- (a) Is used solely for agricultural purposes including the preparation or harvesting of cotton, alfalfa, grains and other farm crops.
  - (b) Is only incidentally operated or moved on a highway whether as a trailer or self-propelled unit. For the purposes of this subdivision, “incidentally operated or moved on a highway” means travel between a farm and another part of the same farm, from one farm to another farm or between a farm and a place of repair, supply or storage.
41. “Limousine” means a motor vehicle providing prearranged ground transportation service for an individual passenger, or a group of passengers, that is arranged in advance or is operated on a regular route or between specified points and includes ground transportation under a contract or agreement for services that includes

a fixed rate or time and is provided in a motor vehicle with a seating capacity not exceeding fifteen passengers including the driver.

42. "Livery vehicle" means a motor vehicle that:
- (a) Has a seating capacity not exceeding fifteen passengers including the driver.
  - (b) Provides passenger services for a fare determined by a flat rate or flat hourly rate between geographic zones or within a geographic area.
  - (c) Is available for hire on an exclusive or shared ride basis.
  - (d) May do any of the following:
    - (i) Operate on a regular route or between specified places.
    - (ii) Offer prearranged ground transportation service as defined in section 28-141.
    - (iii) Offer on demand ground transportation service pursuant to a contract with a public airport, licensed business entity or organization.
43. "Local authority" means any county, municipal or other local board or body exercising jurisdiction over highways under the constitution and laws of this state.
44. "Manufacturer" means a person engaged in the business of manufacturing motor vehicles, trailers or semitrailers.
45. "Minimal risk condition":
- (a) Means a condition to which a human driver or an automated driving system may bring a vehicle in order to reduce the risk of a crash when a given trip cannot or should not be completed.
  - (b) Includes bringing the vehicle to a complete stop.
46. "Moped" means a bicycle, not including an electric bicycle, an electric miniature scooter or an electric standup scooter, that is equipped with a helper motor if the vehicle has a maximum piston displacement of fifty cubic centimeters or less, a brake horsepower of one and one-half or less and a maximum speed of twenty-five miles per hour or less on a flat surface with less than a one percent grade.
47. "Motorcycle" means a motor vehicle that has a seat or saddle for the use of the rider and that is designed to travel on not more than three wheels in contact with the ground but excludes a tractor, an electric bicycle, an electric miniature scooter, an electric standup scooter and a moped.
48. "Motor driven cycle" means a motorcycle, including every motor scooter, with a motor that produces not more than five horsepower but does not include an electric bicycle, an electric miniature scooter or an electric standup scooter.
49. "Motorized quadricycle" means a self-propelled motor vehicle to which all of the following apply:
- (a) The vehicle is self-propelled by an emission-free electric motor and may include pedals operated by the passengers.
  - (b) The vehicle has at least four wheels in contact with the ground.
  - (c) The vehicle seats at least eight passengers, including the driver.
  - (d) The vehicle is operable on a flat surface using solely the electric motor without assistance from the pedals or passengers.

- (e) The vehicle is a commercial motor vehicle as defined in section 28-5201.
  - (f) The vehicle is a limousine operating under a vehicle for hire company permit issued pursuant to section 28-9503.
  - (g) The vehicle is manufactured by a motor vehicle manufacturer that is licensed pursuant to chapter 10 of this title.
  - (h) The vehicle complies with the definition and standards for low-speed vehicles set forth in 49 Code of Federal Regulations sections 571.3(b) and 571.500, respectively.
50. "Motor vehicle":
- (a) Means either:
    - (i) A self-propelled vehicle.
    - (ii) For the purposes of the laws relating to the imposition of a tax on motor vehicle fuel, a vehicle that is operated on the highways of this state and that is propelled by the use of motor vehicle fuel.
  - (b) Does not include a scrap vehicle, a personal delivery device, a personal mobile cargo carrying device, a motorized wheelchair, an electric personal assistive mobility device, an electric bicycle, an electric miniature scooter, an electric standup scooter or a motorized skateboard. For the purposes of this subdivision:
    - (i) "Motorized skateboard" means a self-propelled device that does not have handlebars and that has a motor, a deck on which a person may ride and at least two tandem wheels in contact with the ground.
    - (ii) "Motorized wheelchair" means a self-propelled wheelchair that is used by a person for mobility.
51. "Motor vehicle fuel" includes all products that are commonly or commercially known or sold as gasoline, including casinghead gasoline, natural gasoline and all flammable liquids, and that are composed of a mixture of selected hydrocarbons expressly manufactured and blended for the purpose of effectively and efficiently operating internal combustion engines. Motor vehicle fuel does not include inflammable liquids that are specifically manufactured for racing motor vehicles and that are distributed for and used by racing motor vehicles at a racetrack, use fuel as defined in section 28-5601, aviation fuel, fuel for jet or turbine powered aircraft or the mixture created at the interface of two different substances being transported through a pipeline, commonly known as transmix.
52. "Neighborhood electric shuttle":
- (a) Means a self-propelled electrically powered motor vehicle to which all of the following apply:
    - (i) The vehicle is emission free.
    - (ii) The vehicle has at least four wheels in contact with the ground.
    - (iii) The vehicle is capable of transporting at least eight passengers, including the driver.
    - (iv) The vehicle is a commercial motor vehicle as defined in section 28-5201.
    - (v) The vehicle is a vehicle for hire as defined in section 28-9501 and operates under a vehicle for hire company permit issued pursuant to section 28-9503.

- (vi) The vehicle complies with the definition and standards for low-speed vehicles set forth in 49 Code of Federal Regulations sections 571.3(b) and 571.500, respectively.
  - (b) Includes a vehicle that meets the standards prescribed in subdivision (a) of this paragraph and that has been modified after market and not by the manufacturer to transport up to fifteen passengers, including the driver.
53. “Neighborhood electric vehicle” means a self-propelled electrically powered motor vehicle to which all of the following apply:
- (a) The vehicle is emission free.
  - (b) The vehicle has at least four wheels in contact with the ground.
  - (c) The vehicle complies with the definition and standards for low-speed vehicles, unless excepted or exempted under federal law, set forth in 49 Code of Federal Regulations sections 571.3(b) and 571.500, respectively.
54. “Neighborhood occupantless electric vehicle” means a neighborhood electric vehicle that is not designed, intended or marketed for human occupancy.
55. “Nonresident” means a person who is not a resident of this state as defined in section 28-2001.
56. “Off-road recreational motor vehicle” means a motor vehicle that is designed primarily for recreational nonhighway all-terrain travel and that is not operated on a public highway. Off-road recreational motor vehicle does not mean a motor vehicle used for construction, building trade, mining or agricultural purposes.
57. “Operational design domain”:
- (a) Means operating conditions under which a given automated driving system is specifically designed to function.
  - (b) Includes roadway types, speed range, environmental conditions, such as weather or time of day, and other domain constraints.
58. “Operator” means a person who drives a motor vehicle on a highway, who is in actual physical control of a motor vehicle on a highway or who is exercising control over or steering a vehicle being towed by a motor vehicle.
59. “Owner” means:
- (a) A person who holds the legal title of a vehicle.
  - (b) If a vehicle is the subject of an agreement for the conditional sale or lease with the right of purchase on performance of the conditions stated in the agreement and with an immediate right of possession vested in the conditional vendee or lessee, the conditional vendee or lessee.
  - (c) If a mortgagor of a vehicle is entitled to possession of the vehicle, the mortgagor.
60. “Pedestrian” means any person afoot. A person who uses an electric personal assistive mobility device or a manual or motorized wheelchair is considered a pedestrian unless the manual wheelchair qualifies as a bicycle. For the purposes of this paragraph, “motorized wheelchair” means a self-propelled wheelchair that is used by a person for mobility.

61. "Personal delivery device":
- (a) Means a device that is both of the following:
    - (i) Manufactured for transporting cargo and goods in an area described in section 28-1225.
    - (ii) Equipped with automated driving technology, including software and hardware, that enables the operation of the device with the remote support and supervision of a human.
  - (b) Does not include a personal mobile cargo carrying device.
62. "Personal mobile cargo carrying device" means an electronically powered device that:
- (a) Is operated primarily on sidewalks and within crosswalks and that is designed to transport property.
  - (b) Weighs less than eighty pounds, excluding cargo.
  - (c) Operates at a maximum speed of twelve miles per hour.
  - (d) Is equipped with technology to transport personal property with the active monitoring of a property owner and that is primarily designed to remain within twenty-five feet of the property owner.
  - (e) Is equipped with a braking system that when active or engaged enables the personal mobile cargo carrying device to come to a controlled stop.
63. "Power sweeper" means an implement, with or without motive power, that is only incidentally operated or moved on a street or highway and that is designed for the removal of debris, dirt, gravel, litter or sand whether by broom, vacuum or regenerative air system from asphaltic concrete or cement concrete surfaces, including parking lots, highways, streets and warehouses, and a vehicle on which the implement is permanently mounted.
64. "Public transit" means the transportation of passengers on scheduled routes by means of a conveyance on an individual passenger fare-paying basis excluding transportation by a sightseeing bus, school bus or taxi or a vehicle not operated on a scheduled route basis.
65. "Reconstructed vehicle" means a vehicle that has been assembled or constructed largely by means of essential parts, new or used, derived from vehicles or makes of vehicles of various names, models and types or that, if originally otherwise constructed, has been materially altered by the removal of essential parts or by the addition or substitution of essential parts, new or used, derived from other vehicles or makes of vehicles. For the purposes of this paragraph, "essential parts" means integral and body parts, the removal, alteration or substitution of which will tend to conceal the identity or substantially alter the appearance of the vehicle.
66. "Residence district" means the territory contiguous to and including a highway not comprising a business district if the property on the highway for a distance of three hundred feet or more is in the main improved with residences or residences and buildings in use for business.
67. "Right-of-way" when used within the context of the regulation of the movement of traffic on a highway means the privilege of the immediate use of the highway. Right-of-way when used within the context of the real property on which transportation facilities and appurtenances to the facilities are constructed or maintained means the lands or interest in lands within the right-of-way boundaries.

68. “SAE J3016” means surface transportation recommended practice J3016 taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles published by SAE international in June 2018.
69. “School bus” means a motor vehicle that is designed for carrying more than ten passengers and that is either:
- (a) Owned by any public or governmental agency or other institution and operated for the transportation of children to or from home or school on a regularly scheduled basis.
  - (b) Privately owned and operated for compensation for the transportation of children to or from home or school on a regularly scheduled basis.
70. “Scrap metal dealer” has the same meaning prescribed in section 44-1641.
71. “Scrap vehicle” has the same meaning prescribed in section 44-1641.
72. “Semitrailer” means a vehicle that is with or without motive power, other than a pole trailer or single-axle tow dolly, that is designed for carrying persons or property and for being drawn by a motor vehicle and that is constructed so that some part of its weight and that of its load rests on or is carried by another vehicle. For the purposes of this paragraph, “pole trailer” has the same meaning prescribed in section 28-601.
73. “Single-axle tow dolly” means a nonvehicle device that is drawn by a motor vehicle, that is designed and used exclusively to transport another motor vehicle and on which the front or rear wheels of the drawn motor vehicle are mounted on the tow dolly while the other wheels of the drawn motor vehicle remain in contact with the ground.
74. “State” means a state of the United States and the District of Columbia.
75. “State highway” means a state route or portion of a state route that is accepted and designated by the board as a state highway and that is maintained by the state.
76. “State route” means a right-of-way whether actually used as a highway or not that is designated by the board as a location for the construction of a state highway.
77. “Street” or “highway” means the entire width between the boundary lines of every way if a part of the way is open to the use of the public for purposes of vehicular travel.
78. “Taxi” means a motor vehicle that has a seating capacity not exceeding fifteen passengers, including the driver, that provides passenger services and that:
- (a) Does not primarily operate on a regular route or between specified places.
  - (b) Offers local transportation for a fare determined on the basis of the distance traveled or prearranged ground transportation service as defined in section 28-141 for a predetermined fare.
79. “Title transfer form” means a paper or an electronic form that is prescribed by the department for the purpose of transferring a certificate of title from one owner to another owner.
80. “Traffic survival school” means a school that is licensed pursuant to chapter 8, article 7.1 of this title and that offers educational sessions that are designed to improve the safety and habits of drivers and that are approved by the department.

81. "Trailer" means a vehicle that is with or without motive power, other than a pole trailer or single-axle tow dolly, that is designed for carrying persons or property and for being drawn by a motor vehicle and that is constructed so that no part of its weight rests on the towing vehicle. A semitrailer equipped with an auxiliary front axle commonly known as a dolly is deemed to be a trailer. For the purposes of this paragraph, "pole trailer" has the same meaning prescribed in section 28-601.
82. "Transportation network company" has the same meaning prescribed in section 28-9551.
83. "Transportation network company vehicle" has the same meaning prescribed in section 28-9551.
84. "Transportation network service" has the same meaning prescribed in section 28-9551.
85. "Truck" means a motor vehicle designed or used primarily for the carrying of property other than the effects of the driver or passengers and includes a motor vehicle to which has been added a box, a platform or other equipment for such carrying.
86. "Truck tractor" means a motor vehicle that is designed and used primarily for drawing other vehicles and that is not constructed to carry a load other than a part of the weight of the vehicle and load drawn.
87. "Vehicle":
  - (a) Means a device in, on or by which a person or property is or may be transported or drawn on a public highway.
  - (b) Does not include:
    - (i) Electric bicycles, electric miniature scooters, electric standup scooters and devices moved by human power.
    - (ii) Devices used exclusively on stationary rails or tracks.
    - (iii) Personal delivery devices.
    - (iv) Scrap vehicles.
    - (v) Personal mobile cargo carrying devices.
88. "Vehicle transporter" means either:
  - (a) A truck tractor capable of carrying a load and drawing a semitrailer.
  - (b) A truck tractor with a stinger-steered fifth wheel capable of carrying a load and drawing a semitrailer or a truck tractor with a dolly mounted fifth wheel that is securely fastened to the truck tractor at two or more points and that is capable of carrying a load and drawing a semitrailer.

**A.R.S. § 28-601. Definitions.**

In this chapter, unless the context otherwise requires:

1. "Commercial motor vehicle" means a motor vehicle or combination of vehicles that is designed, used or maintained to transport passengers or property in the furtherance of a commercial enterprise, that is a commercial motor vehicle as defined in section 28-5201 and that is not exempt from gross weight fees as prescribed in section 28-5432, subsection B.



2. "Controlled access highway" means a highway, street or roadway to or from which owners or occupants of abutting lands and other persons have no legal right of access except at such points only and in the manner determined by the public authority that has jurisdiction over the highway, street or roadway.
3. "Crosswalk" means:
  - (a) That part of a roadway at an intersection included within the prolongations or connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in absence of curbs, from the edges of the traversable roadway.
  - (b) Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing by lines or other markings on the surface.
4. "Escort vehicle" means a vehicle that is required pursuant to rules adopted by the department to escort motor vehicles or combinations of vehicles that require issuance of a permit pursuant to article 18 or 19 of this chapter for operation on the highways of this state.
5. "Explosives" means any chemical compound, mixture or device that is commonly used or intended for the purpose of producing an explosion and that is defined in 49 Code of Federal Regulations part 173.
6. "Flammable liquid" means any liquid that has a flash point of less than one hundred degrees Fahrenheit and that is defined in 49 Code of Federal Regulations section 173.120.
7. "Gross weight" means the weight of a vehicle without a load plus the weight of any load on the vehicle.
8. "Intersection" means the area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways joining at any other angle may come in conflict. If a highway includes two roadways thirty or more feet apart, each crossing of each roadway of the divided highway by an intersecting highway is a separate intersection. If the intersecting highway also includes two roadways thirty or more feet apart, each crossing of two roadways of the highways is a separate intersection.
9. "License" means any license, temporary instruction permit or temporary license issued under the laws of this state or any other state that pertain to the licensing of persons to operate motor vehicles.
10. "Low emission and energy efficient vehicle" means a vehicle that has been certified by the United States environmental protection agency administrator in accordance with 23 United States Code section 166 or that is part of a federally approved pilot program.
11. "Motorized wheelchair" means any self-propelled wheelchair that is used by a person for mobility.
12. "Official traffic control device" means any sign, signal, marking or device that is not inconsistent with this chapter and that is placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning or guiding traffic.
13. "Park", if prohibited, means the standing of a vehicle, whether occupied or not, otherwise than temporarily for the purpose of and while actually engaged in loading or unloading.
14. "Photo enforcement system" means a device substantially consisting of a radar unit or sensor linked to a camera or other recording device that produces one or more photographs, microphotographs, videotapes or

digital or other recorded images of a vehicle's license plate for the purpose of identifying violators of articles 3 and 6 of this chapter.

15. "Pneumatic tire" means a tire in which compressed air is designed to support the load.
16. "Pole trailer" means a vehicle that is all of the following:
  - (a) Without motive power.
  - (b) Designed to be drawn by another vehicle and attached to the towing vehicle by means of a reach or pole or by being boomed or otherwise secured to the towing vehicle.
  - (c) Used ordinarily for transporting long or irregularly shaped loads such as poles, pipes or structural members capable generally of sustaining themselves as beams between the supporting connections.
17. "Police officer" means an officer authorized to direct or regulate traffic or make arrests for violations of traffic rules or other offenses.
18. "Private road or driveway" means a way or place that is in private ownership and that is used for vehicular travel by the owner and those persons who have express or implied permission from the owner but not by other persons.
19. "Railroad" means a carrier of persons or property on cars operated on stationary rails.
20. "Railroad sign or signal" means a sign, signal or device erected by authority of a public body or official or by a railroad and intended to give notice of the presence of railroad tracks or the approach of a railroad train.
21. "Railroad train" means a steam engine or any electric or other motor that is with or without cars coupled to the steam engine or electric or other motor and that is operated on rails.
22. "Roadway" means that portion of a highway that is improved, designed or ordinarily used for vehicular travel, exclusive of the berm or shoulder. If a highway includes two or more separate roadways, roadway refers to any such roadway separately but not to all such roadways collectively.
23. "Safety zone" means the area or space that is both:
  - (a) Officially set apart within a roadway for the exclusive use of pedestrians.
  - (b) Protected or either marked or indicated by adequate signs as to be plainly visible at all times while set apart as a safety zone.
24. "Sidewalk" means that portion of a street that is between the curb lines or the lateral lines of a roadway and the adjacent property lines and that is intended for the use of pedestrians.
25. "Stop", if required, means complete cessation from movement.
26. "Stop, stopping or standing", if prohibited, means any stopping or standing of an occupied or unoccupied vehicle, except when necessary to avoid conflict with other traffic or in compliance with directions of a police officer or traffic control sign or signal.
27. "Through highway" means a highway or portion of a highway at the entrances to which vehicular traffic from intersecting highways is required by law to stop before entering or crossing and when stop signs are erected as provided in this chapter.

28. "Traffic" means pedestrians, ridden or herded animals, vehicles and other conveyances either singly or together while using a highway for purposes of travel.
29. "Traffic control signal" means a device, whether manually, electrically or mechanically operated, by which traffic is alternately directed to stop and to proceed.
30. "Truck" means a motor vehicle that is designed, used or maintained primarily for the transportation of property.

**A.R.S. § 28-1092. Reasonable access; definitions**

- A. The department shall provide reasonable access to vehicles of legal size to and from terminals and service facilities within one road mile of the national network on highways within its jurisdiction.
- B. The local authority shall provide reasonable access to vehicles of legal size to and from terminals and service facilities within one road mile of the national network on highways within its jurisdiction. The local authority shall provide the director with a list of routes or maps designating the highways on which reasonable access is denied by December 1, 1992. The local authority shall update the list annually beginning on December 31, 1993. The department shall consolidate and publish the list annually.
- C. Except as otherwise provided by this title, the department or the local authority shall provide reasonable access to vehicles of legal size beyond one road mile of the national network on a route on highways within its jurisdiction if both of the following apply:
  1. A test drive on the route or an application of a vehicle template to a plan of the route shows that vehicles of legal size can safely travel on the route.
  2. The vehicles are of legal size.
- D. The department and the local authority may deny reasonable access to or from the national network by a vehicle of legal size on highways within their jurisdiction as follows:
  1. Reasonable access may be denied if access would result in a significant and clearly evident safety problem in relation to a vehicle of legal size.
  2. For vehicles that are at least one hundred two inches wide, reasonable access may be denied on specific routes with lanes that are ten feet wide or less.
  3. Reasonable access may be denied if denial is related to the specific configuration and resultant safety factor of the individual route, including structural hazards.
  4. In denying reasonable access, the department or local authority shall not grant exceptions for categories, types or groups of routes.
- E. A person shall submit a written request for reasonable access to the department if it concerns highways under its jurisdiction or to the local authority if it concerns highways under its jurisdiction. If a written request for reasonable access is not acted on within ninety days after receipt by the appropriate jurisdiction, reasonable access is approved. If a written request for reasonable access is denied by the department or the local authority, the person may appeal to the jurisdiction that denied access, and the jurisdiction shall issue a decision within

ninety days. If the appeal is denied by the local jurisdiction, the person may request a review by the director of the denial of access.

- F. The department shall design a uniform symbol that is an exception sign to convey information that access is denied. The department shall use the sign to indicate any point of exit from the national network that does not have a connecting state or local authority access route to terminals or service facilities.
- G. The department or a local authority shall not require a person to obtain a permit for a vehicle of legal size or to pay a fee to gain reasonable access pursuant to this section.
- H. For purposes of this section:
  - 1. “National network” means the system of highways that is a part of any segment of the national system of interstate and defense highways or any other qualifying federal aid highway or state highway designated by the director as authorized by the surface transportation assistance act of 1982 (P.L. 97-424; 96 Stat. 2097) and designated pursuant to section 28-1093.
  - 2. “Reasonable access” means providing the most reasonable and practical route available, including allowance for return of the vehicle to the national network on a route other than the route traveled to the terminal or service facility if it is feasible and more practical to follow the alternate route, unless allowing access would result in a significant and clearly evident safety problem.
  - 3. “Service facility” means a facility that provides food, fuel, lodging, repairs or emergency medical care.
  - 4. “Terminal” means a location where either:
    - (a) Freight originates, terminates or is handled in the transportation process.
    - (b) Commercial motor carriers maintain operating facilities.
  - 5. “Vehicle of legal size” means a vehicle of a size that meets the limitations prescribed in section 28-1093, subsection C, section 28-1094 and section 28-1095, subsections A and B, subsection C, paragraphs 1, 2, 3 and 4 and subsection D.

**A.R.S. § 28-1099. Single axle load limit; exceptions**

- A. The gross weight imposed on the highway by the wheels of any one axle of a vehicle shall not exceed twenty thousand pounds, except that:
  - 1. The director may issue a special permit pursuant to section 28-1103 for the purpose of moving road machinery that exceeds the maximum weight specified in this section from job to job within this state and from job to place of servicing and return within this state.
  - 2. Any over-the-road bus may exceed the maximum single axle weight limit but shall not exceed twenty-four thousand pounds. For the purposes of this paragraph, “Over-the-road bus” means a bus characterized by an elevated passenger deck located over a baggage compartment.
- B. This section does not limit in any manner the power of the director and a local authority to issue a special permit pursuant to section 28-1103.

- C. For the purposes of this article, the gross weight imposed on the highway by the wheels of any one axle equals the total load transmitted to the road by all wheels whose centers are included between two parallel transverse vertical planes forty inches apart, extending across the full width of the vehicle.

**A.R.S. § 28-1100. Vehicles and loads; gross weight restrictions; exceptions**

- A. Except as provided in subsection H of this section or section 28-1099, a person may operate a vehicle on all highways, including a toll facility as defined in section 28-7751, subject to the following maximum gross weights:

1. Twenty thousand pounds, including enforcement tolerances, on any one axle.
2. Thirty-four thousand pounds, including enforcement tolerances, on a tandem axle.
3. Eighty thousand pounds on a vehicle combination of five axles or more.
4. On a group of two or more consecutive axles, including any steering or castering axles, an overall gross weight, including enforcement tolerances, produced by application of the following formula in which W equals overall gross weight on any group of two or more consecutive axles to the nearest five hundred pounds, L equals distance in feet between the extreme of any group of two or more consecutive axles to the nearest foot and N equals number of axles in any group under consideration, except that two consecutive sets of tandem axles may carry a gross load of thirty-four thousand pounds each if the overall distance between the first and last axles of the consecutive sets of tandem axles is thirty-six feet or more if the overall gross weight does not exceed eighty thousand pounds, including all enforcement tolerances:

$$W = 500 (LN/(N-1) + 12N + 36)$$

- B. For the purposes of subsection A of this section, “tandem axles” means two or more consecutive axles that are more than forty inches but not more than ninety-six inches apart.
- C. This section does not apply to a vehicle and load that cannot be easily dismantled or divided and that have been issued a special permit pursuant to section 28-1103.
- D. It is not a defense in a prosecution for a violation of this section that a vehicle or vehicle combination is registered for a declared gross weight as defined in section 28-5431 in excess of the amount allowed under this section. The department shall not make an allowance or refund for fees paid for the weight in excess of the amount allowed under this section.
- E. A single vehicle or a single vehicle of a combination of vehicles shall not be equipped with more than three axles, including the front steering axle, unless the additional axles are steering axles or castering axles. The limitation on the number of axles provided in this subsection does not apply to a vehicle operated with a permit issued pursuant to section 28-1103.
- F. A vehicle or combination of vehicles equipped with one or more variable load axles shall have the pressure control preset and located outside of the cab so that the operator of the vehicle cannot vary the weight carried on the variable load axle or axles during transport of a load. The actuating control that raises or lowers the axle or axles may be located inside the cab for safety purposes. This actuating control must completely raise or completely lower the axle or axles when activated.

- G. This section does not apply to a truck that meets all of the following requirements and for which a special permit has been issued pursuant to section 28-1103:
1. Is equipped with a conveyor bed.
  2. Is used solely as a fiber and forage module mover.
  3. Does not exceed forty-eight feet in length.
  4. Is only operated each year from August 1 through January 30, unless the director extends the period of use.
- H. The gross weight of a heavy-duty vehicle that is equipped with idle reduction technology and the gross weight imposed on the highway by the wheels of any one axle or axle group of the vehicle may exceed the weight limitation specified in subsection A of this section by not more than five hundred fifty pounds or the weight of the idle reduction technology, whichever is less. This subsection only applies if the heavy-duty vehicle operator, on request, proves by written certification the weight of the idle reduction technology and, by demonstration or certification, that the idle reduction technology is fully functional at all times. For the purposes of this subsection, “heavy-duty vehicle” and “idle reduction technology” have the same meanings prescribed in 42 United States Code section 16104a.
- I. The gross weight of a vehicle operated by an engine fueled primarily by natural gas, battery electric, or hydrogen and the gross weight imposed on the highway by the wheels of any one axle or axle group of the vehicle may exceed the weight limitation specified in subsection A of this section, but may not exceed eighty-two thousand pounds or an amount that is equal to the difference between the weight of the vehicle attributable to the natural gas tank and fueling system or battery electric or hydrogen fuel cell electric fueling system and the weight of a comparable diesel tank and fueling system, whichever is less.

**A.R.S. § 28-1141. Definitions**

In this article, unless the context otherwise requires:

1. “Envelope” means the outermost dimensions of a load or vehicle to include width, height and length and the weight of the vehicle or its load.
2. “Envelope permit” means a permit issued by the department authorizing a person to transport property on the highways of this state pursuant to all applicable statutes and local ordinances and the terms listed on the permit.
3. “Power unit” means a vehicle that propels itself or tows a trailer or combination of vehicles on the highways of this state.

**A.R.S. § 28-2001. Definitions.**

A. “Resident”, for the purpose of registration and operation of motor vehicles:

1. Except as provided by paragraph 2, means the following:
  - (a) A person who, regardless of domicile, remains in this state for an aggregate period of seven months or more during a calendar year.
  - (b) A person who engages in a trade, profession or occupation in this state or who accepts employment in other than either:

- (i) Seasonal agricultural work.
  - (ii) Temporary seasonal work for a period of not more than three months if the state in which the temporary seasonal worker is permanently domiciled has a similar exception.
  - (c) A person who places children in a public school without payment of nonresident tuition.
  - (d) A person who declares that the person is a resident of this state for the purpose of obtaining at resident rates a state license or tuition fees at an educational institution maintained by public monies.
  - (e) An individual, partnership, company, firm, corporation or association that maintains a main office, a branch office or warehouse facilities in this state and that bases and operates motor vehicles in this state.
  - (f) An individual, partnership, company, firm, corporation or association that operates motor vehicles in intrastate transportation, for other than seasonal agricultural work.
  - (g) A person who is registered to vote in this state.
2. Does not mean:
- (a) A nonresident owner of a foreign vehicle that is registered and licensed in a state adjoining this state and that is used in this state for other than the transportation of passengers or property for compensation, if the nonresident owner and vehicle are domiciled in an adjoining state but within twenty-five miles of the border of this state and if the state in which the owner resides and in which the vehicle is registered exempts from payment of registration and weight fees like vehicles from this state, regardless of whether the nonresident owner engages in a trade, profession or occupation in this state or accepts employment.
  - (b) An out-of-state student enrolled with seven or more semester hours regardless of whether the student engages in a trade, profession or occupation in this state or accepts employment in this state. For the purposes of this paragraph, "out-of-state student" means either:
    - (i) A person who is enrolled at an educational institution maintained by public monies and who is not classified as an in-state student under section 15-1802.
    - (ii) A person who is a student at a private educational institution and who would not be classified as an in-state student under section 15-1802 if the student were attending a public educational institution.
  - (c) A nonresident daily commuter as defined in section 28-2291.

B. In this chapter, unless the context otherwise requires:

1. "Mobile home" means a structure that is transportable in one or more sections, including the plumbing, heating, air conditioning and electrical systems that are contained in the structure, and that, when erected on site, is either of the following:
  - (a) More than eight body feet in width, thirty-two body feet or more in length and built on a permanent chassis.
  - (b) Regardless of the size, used as a single family dwelling or for commercial purposes with or without a permanent foundation.

2. "Serial number" means the number placed on the vehicle by its manufacturer or assigned pursuant to section 28-2165.

**A.R.S. § 28-4301. Definitions**

In this chapter, unless the context otherwise requires:

1. "Area of responsibility" means the area surrounding an individual dealer that the factory designates as that dealer's individual primary geographic territory for the purpose of marketing, promoting, selling and leasing new motor vehicles. In the absence of the factory designated area, the area of responsibility is that geographical area surrounding a dealer that lies closer to that dealer than to other dealers of the same line-make.
2. "Branch license" means a license that is issued by the director to a licensed motor vehicle dealer and that permits the licensee to sell motor vehicles from an established place of business within the same county but other than the original or principal place of business for which the license was issued.
3. "Broker" means a person who for any fee, commission or other valuable consideration offers to provide, provides or represents that the person will provide a service of arranging or assisting in effecting the purchase of a motor vehicle and who is not:
  - (a) A new motor vehicle dealer or an employee or agent of a new motor vehicle dealer.
  - (b) A used motor vehicle dealer or an employee or agent of a used motor vehicle dealer.
  - (c) A manufacturer or employee or agent of a manufacturer.
  - (d) An auctioneer or engaged in the auto auction business.
  - (e) A wholesale motor vehicle dealer.
4. "Community" means the relevant market area. For the purposes of this paragraph, "relevant market area" means the incorporated city or town in which the franchise is located.
5. "Distributor" means a person who either:
  - (a) Sells or distributes new motor vehicles to new motor vehicle dealers in this state.
  - (b) Maintains distributor representatives in this state.
6. "Distributor branch" means a branch office maintained or availed of by a distributor for either:
  - (a) The sale of new motor vehicles to new motor vehicle dealers in this state.
  - (b) Directing or supervising its representatives in this state.
7. "Established place of business":
  - (a) Means a permanent enclosed building or structure that is owned either in fee or leased with sufficient space to display two or more motor vehicles of a kind and type that the dealer is licensed to sell and that is devoted principally to the use of a motor vehicle dealer in the conduct of the business of the dealer.
  - (b) In the case of a used motor vehicle dealer, trailer dealer or semitrailer dealer:
    - (i) Need not be a permanent building or structure or part of a permanent building or structure.
    - (ii) May be a vacant lot or part of a vacant lot.



- (iii) Does not mean or include a residence, tent, temporary stand or temporary quarters or permanent quarters occupied pursuant to a temporary arrangement.
- (c) In the case of an automotive recycler, means a permanent site or location at which the business of an automotive recycler is or will be conducted.
- 8. “Exhibitor” means a manufacturer of new motor homes that exhibits new motor homes at a special event.
- 9. “Factory branch” means a branch office maintained or availed of by a manufacturer for either:
  - (a) The sale of new motor vehicles to distributors or the sale of new motor vehicles to new motor vehicle dealers in this state.
  - (b) Directing or supervising its representatives in this state.
- 10. “Financial institution” means a bank, trust company, savings and loan association, credit union, consumer lender, international banking facility or holding company that is licensed, regulated or insured by the department of insurance and financial institutions, the federal deposit insurance corporation, the office of thrift supervision, the comptroller of the currency, the national credit union share insurance fund or the national credit union administration.
- 11. “Franchise” means a contract between two or more persons if all of the following conditions are included:
  - (a) A commercial relationship of definite duration or continuing indefinite duration is involved.
  - (b) The franchisee is granted the right to offer, sell and service in this state new motor vehicles manufactured or distributed by the franchisor.
  - (c) The franchisee, as a separate business, constitutes a component of the franchisor’s distribution system.
  - (d) The operation of the franchisee’s business is substantially associated with the franchisor’s trademark, service mark, trade name, advertising or other commercial symbol designating the franchisor.
  - (e) The operation of the franchisee’s business is substantially reliant on the franchisor for the continued supply of new motor vehicles, parts and accessories.
- 12. “Franchisee” means a person who both:
  - (a) Receives new motor vehicles from the franchisor under a franchise.
  - (b) Offers and sells to and services new motor vehicles for the general public.
- 13. “Franchisor” means a person who both:
  - (a) Manufactures or distributes new motor vehicles.
  - (b) May enter into a franchise.
- 14. “Importer” means a person who transports or arranges for the transportation of a foreign manufactured new motor vehicle into the United States for sale in this state.
- 15. “Lead” means any retail consumer who satisfies all of the following:
  - (a) Responds to a factory-directed program that obtains consumer contact information and that provides such information to one or more dealers.
  - (b) Expresses an interest to the factory in purchasing, leasing or acquiring any vehicle or product, service or financing available from the dealers of that factory.

- (c) Does not qualify for any reasonable factory sponsored employee, retiree or vendor new vehicle purchase program or any other reasonable similar factory new vehicle purchase program.
- 16. “Line-make” means those motor vehicles that are offered for sale, lease or distribution under a common name, trademark, service mark or brand name of the manufacturer of those same motor vehicles.
- 17. “Major component part” includes a motor vehicle or vehicle part that the manufacturer has assigned any factory, motor, serial or other identification number or mark.
- 18. “Manufacturer” means any person who either:
  - (a) Manufactures or assembles new motor vehicles.
  - (b) Manufactures or installs on previously assembled truck chassis special bodies or equipment that when installed forms an integral part of the new motor vehicle and that constitutes a major manufacturing alteration, excluding the installation of a camper on a pickup truck.
- 19. “Motor home” means a motor vehicle that is primarily designed as temporary living quarters and that:
  - (a) Is built onto as an integral part of, or is permanently attached to, a motor vehicle chassis.
  - (b) Contains at least four of the following independent life support systems if each is permanently installed and designed to be removed only for purposes of repair or replacement:
    - (i) A cooking facility with an onboard fuel source.
    - (ii) A gas or electric refrigerator.
    - (iii) A toilet with exterior evacuation.
    - (iv) A heating or air conditioning system with an onboard power or fuel source separate from the vehicle engine.
    - (v) A potable water supply system that includes at least a sink, a faucet and a water tank with an exterior service supply connection.
    - (vi) A 110-125 volt electric power supply.
- 20. “Motor vehicle” means an automobile, motor bus, motorcycle, truck or truck tractor or any other self-propelled vehicle, trailer or semitrailer.
- 21. “Motor vehicle dealer” means a new motor vehicle dealer, a used motor vehicle dealer, a public consignment auction dealer, a broker or a wholesale motor vehicle auction dealer, excluding a person who comes into possession of a motor vehicle as an incident to the person’s regular business and who sells, auctions or exchanges the motor vehicle.
- 22. “New house trailer dealer” means a person who buys, sells, exchanges or offers or attempts to negotiate a sale or exchange of an interest in, or who is engaged in the business of selling, new house trailers or used house trailers taken in trade on new house trailers. For the purposes of this paragraph, “house trailer” means a vehicle, other than a motor vehicle, that is built on a chassis designed for being drawn on the highways by a motor vehicle and that is designed for human habitation.
- 23. “New motor vehicle” means a motor vehicle, other than a used motor vehicle, that is held either for:
  - (a) Sale by the franchisee who first acquired the vehicle from the manufacturer or distributor of the vehicle.

- (b) Sale by another franchisee of the same line-make.
24. “New motor vehicle dealer” means a person who buys, sells, exchanges or offers or attempts to negotiate a sale or exchange of an interest in, or who is engaged in the business of selling, new motor vehicles or used motor vehicles taken in trade on new motor vehicles or used vehicles purchased for resale.
25. “Off-premises display and sales” means a promotion or sale of motor vehicles for a period of time as specified by the director that both:
- (a) Is sponsored by a licensed motor vehicle dealer, the licensed motor vehicle dealer’s agents or the manufacturer.
  - (b) Takes place at a location within the same county but not at the licensee’s established place of business.
26. “Off-premises exhibition” means the exhibition of a motor vehicle for a period of time as specified by the director at a location within the same county but not at the established place of business of a licensed motor vehicle dealer and at which a solicitation or sale does not occur.
27. “Provisional automotive recycler’s license” means a license that both:
- (a) Is issued by the department only in conjunction with an application for an automotive recycler’s license.
  - (b) Permits the applicant or applicants to conduct the business of an automotive recycler regulated by this chapter pending completion of the criminal records check pursuant to section 28-4361.
28. “Provisional dealer’s license” means a license that both:
- (a) Is issued by the department only in conjunction with an application for a dealer’s license.
  - (b) Permits the applicant or applicants to conduct the business of a motor vehicle dealer regulated by this chapter pending completion of the criminal records check pursuant to section 28-4361.
29. “Public consignment auction dealer” means a person who at the public consignment auction dealer’s established place of business or at an authorized off-premises location pursuant to the requirements of section 28-4401 is in the business of both of the following:
- (a) Conducting live auctions with a licensed auctioneer verbally calling for and accepting bids.
  - (b) Providing live auction services to the public on a consignment contract basis.
30. “Retail consumer” means any person purchasing, leasing or acquiring or possibly purchasing, leasing or acquiring a vehicle or product, service or financing not for resale.
31. “Service” means any service that is sold, leased or provided to retail consumers and that directly relates to the ownership or leasing of a new or used motor vehicle, including extended service contracts or motor vehicle warranty and nonwarranty repairs or maintenance, including both parts and labor.
32. “Special event” means an exhibition of new motor homes by a motor vehicle dealer licensed to sell new motor homes or an exhibitor for a period of time specified by the director at a location in this state other than the licensee’s or exhibitor’s established place of business.
33. “Used motor vehicle” means a motor vehicle that has been sold, bargained, exchanged or given away or the title to the motor vehicle has been transferred from the person who first acquired the vehicle from the manufacturer, or importer, dealer or agent of the manufacturer or importer, and that has been placed in

bona fide consumer use. For the purposes of this paragraph, “bona fide consumer use” means actual operation by an owner who acquired a new motor vehicle both:

- (a) For use in the owner’s business or for pleasure or otherwise.
  - (b) For which a certificate of title has been issued or that has been registered as provided by law.
34. “Used motor vehicle dealer” means a person, other than a new motor vehicle dealer, who buys, sells, auctions, exchanges or offers or attempts to negotiate a sale or exchange of an interest in, or who is engaged in the business of selling, seven or more used motor vehicles in a continuous twelve month period. Used motor vehicle dealer does not include a wholesale motor vehicle auction dealer or a public consignment auction dealer.
35. “Wholesale motor vehicle auction dealer” means a person who both:
- (a) Is in the business of providing auction services solely in wholesale transactions to motor vehicle dealers licensed by this state or any other jurisdiction.
  - (b) Does not buy, sell or own the motor vehicles the auction dealer auctions in the ordinary course of business.
36. “Wholesale motor vehicle dealer” means a person who sells used motor vehicles only to licensed motor vehicle dealers.

**A.R.S. § 28-5201. Definitions**

In this chapter, unless the context otherwise requires:

1. “Commercial motor vehicle” means a motor vehicle or combination of motor vehicles that is designed, used or maintained to transport passengers or property in the furtherance of a commercial enterprise on a highway in this state, that is not exempt from the gross weight fees as prescribed in section 28-5432, subsection B and that includes any of the following:
  - (a) A single vehicle or combination of vehicles that has a gross vehicle weight rating of twenty-six thousand one or more pounds and that is used for the purposes of intrastate commerce.
  - (b) A single vehicle or combination of vehicles that has a gross vehicle weight rating of ten thousand one or more pounds and that is used for the purposes of interstate commerce.
  - (c) A school bus.
  - (d) A bus.
  - (e) A vehicle that transports passengers for hire and that has a design capacity for eight or more persons.
  - (f) A vehicle that is used in the transportation of materials found to be hazardous for the purposes of the hazardous materials transportation authorization act of 1994 (49 United States Code sections 5101 through 5128) and that is required to be placarded under 49 Code of Federal Regulations section 172.504, as adopted by the department pursuant to this chapter.
2. “Declared gross weight” has the same meaning prescribed in section 28-5431. If a declaration has not been made, declared gross weight means gross weight.
3. “Gross weight” has the same meaning prescribed in section 28-5431.

4. "Hazardous material" means a substance that has been determined by the United States department of transportation under 49 Code of Federal Regulations to be capable of posing an unreasonable risk to health, safety and property if transported in commerce.
5. "Hazardous substance" means a material and its mixtures or solutions that has been determined by the United States department of transportation under 49 Code of Federal Regulations to be capable of posing an unreasonable risk to health, safety and property if transported in commerce.
6. "Hazardous waste" means a material that is subject to the hazardous waste manifest requirements of the department of environmental quality or the United States environmental protection agency.
7. "Manufacturer" means a person who transports or causes to be transported or shipped by a motor vehicle a material that is represented, marked, certified or sold by a person for transportation in commerce.
8. "Motor carrier" means a person who operates or causes to be operated a commercial motor vehicle on a public highway.
9. "Motor vehicle" means any vehicle, machine, truck tractor, trailer or semitrailer that is propelled or drawn by mechanical power and that is used on a public highway in the transportation of passengers or property in the furtherance of a commercial enterprise.
10. "Person" means a public or private corporation, company, partnership, firm, association or society of persons, the federal government and its departments or agencies, this state or any of its agencies, departments, political subdivisions, counties, towns or municipal corporations or a natural person.
11. "Public highway" means a public street, alley, road, highway or thoroughfare of any kind in this state that is used by the public or that is open to the use of the public as a matter of right, for the purpose of vehicular travel.
12. "Shipper" means a person who offers a material for motor vehicle transportation in commerce.
13. "Transportation" means a movement of person or property by a motor vehicle and any loading, unloading or storage incidental to the movement.
14. "Vehicle combination" has the same meaning prescribed in section 28-5431.

#### **A.R.S. § 28-5601. Definitions**

In this article and articles 2 and 5 of this chapter, unless the context otherwise requires:

1. "Blending":
  - (a) Means the mixing of one or more products, regardless of the original character of the product blended, if the product obtained by the blending is capable of use or otherwise sold for use in the generation of power for the propulsion of a motor vehicle, aircraft or watercraft.
  - (b) Does not include blending that occurs in the process of refining by the original refiner of crude petroleum or the blending of products known as lubricating oil and greases.
2. "Bulk end user" means a person who receives into the person's own storage facilities in transport truck lots motor fuel for the person's own consumption.

3. "Bulk plant" means a motor fuel storage and distribution facility that is not a terminal and from which motor fuel may be removed at a rack.
4. "Bulk transfer" means any transfer of motor fuel from one location to another by pipeline tender or marine delivery within the bulk transfer terminal system.
5. "Bulk transfer terminal system" means the motor fuel distribution system consisting of refineries, pipelines, marine vessels and terminals. Motor fuel in a refinery, pipeline, vessel or terminal is in the bulk transfer terminal system. Motor fuel in the fuel supply tank of any engine, or in any tank car, rail car, trailer, truck or other equipment suitable for ground transportation, is not in the bulk transfer terminal system.
6. "Consumer" means the end purchaser of motor vehicle fuel for use on the highways in this state, the end purchaser of motor vehicle fuel for use in watercraft on waterways of this state or the end purchaser of aviation fuel for use in aircraft.
7. "Destination state" means the state, territory or foreign country to which motor fuel is directed for delivery into a storage facility, a receptacle, a container or a type of transportation equipment for the purpose of resale or use.
8. "Distributor" means a person who acquires motor fuel from a supplier or another distributor for subsequent sale or use and who may blend or import into or export from this state motor fuel in the original package or container or otherwise but excluding a person who imports motor fuel in the fuel tank of a motor vehicle or aircraft.
9. "Dyed diesel fuel" means diesel fuel that is dyed pursuant to United States internal revenue service regulations or requirements, including any invisible marker requirements.
10. "Fuel tank" means a receptacle on a motor vehicle, watercraft or aircraft from which fuel is supplied for the propulsion of the motor vehicle, watercraft or aircraft, excluding a cargo tank but including a separate compartment of a cargo tank used as a fuel tank and an auxiliary tank or receptacle of any kind from which fuel is supplied for the propulsion of the motor vehicle, watercraft or aircraft, whether or not the tank or receptacle is directly connected to the fuel supply line of the motor vehicle, watercraft or aircraft.
11. "Highway" means any way or place in this state of whatever nature that is maintained by public monies and that is open to the use of the public for purposes of vehicular travel, including a highway under construction.
12. "In this state" means any way or place within the exterior limits of the state of Arizona that is maintained by public monies, including any such way or place that is owned by or ceded to the United States of America.
13. "Indian reservation" means all lands that are within the limits of areas set aside by the United States for the exclusive use and occupancy of Indian tribes by treaty, law or executive order and that are currently recognized as Indian reservations by the United States department of the interior.
14. "Indian tribe" means any organized nation, tribe, band or community recognized as an Indian tribe by the United States department of the interior.

15. "Interstate user" means a person registering a use class motor vehicle under chapter 7, article 7 or 8 of this title or section 28-2321 or 28-2324.
16. "Invoiced gallons" means the gallons actually billed on an invoice in payment to a supplier.
17. "Light class motor vehicle" means a motor vehicle that uses use fuel on the highways in this state but excludes a road tractor, truck tractor, truck or passenger carrying vehicle having a declared gross vehicle weight of more than twenty-six thousand pounds or having more than two axles.
18. "Motor fuel" means motor vehicle fuel, use fuel and aviation fuel.
19. "Motor vehicle" means a self-propelled vehicle required to be licensed or subject to licensing for operation on a highway.
20. "Permissive supplier" means an out-of-state supplier that elects, but is not required, to have a supplier's license pursuant to this article.
21. "Person" means an individual, firm, partnership, joint venture, association, corporation, estate, trust, business trust, receiver or syndicate, this state, any county, city, town, district or other subdivision of this state, an Indian tribe, or any other group or combination acting as a unit.
22. "Position holder":
  - (a) Means the person who holds the inventory position in motor fuel in a terminal, as reflected on the records of the terminal operator. For the purposes of this subdivision, "a person who holds the inventory position in motor fuel" means a person who has a contract with the terminal operator for the use of storage facilities and terminaling services for fuel at the terminal.
  - (b) Includes a terminal operator who owns fuel in the terminal.
23. "Public monies" means those monies that are received by this state and that are derived all or in part from tax revenues or other funding sources.
24. "Qualified terminal" means a terminal that is designated as a qualified terminal pursuant to the United States internal revenue code, regulation and practices and that has been assigned a terminal control number by the United States internal revenue service.
25. "Rack" means a mechanism for delivering motor fuel from a refinery, a terminal or a bulk plant into a railroad tank car, a transport truck or other means of transfer that is outside the bulk transfer terminal system.
26. "Refiner" means any person who owns, operates or otherwise controls a refinery within the United States.
27. "Refinery" means a facility that is used to produce motor fuel from crude oil, unfinished oils, natural gas liquids, transmix or other hydrocarbons or by blending and from which motor fuel may be removed by pipeline, by vessel or at a rack.
28. "Road tractor" means a motor vehicle that is designed and used for drawing other vehicles and that is not constructed to carry either a load independently or any part of the weight of a vehicle or load so drawn.
29. "Sell" includes a transfer of title or possession, exchange or barter in any manner or by any means.
30. "Supplier":

- (a) Means a person who is registered pursuant to section 4101 of the United States internal revenue code for transactions in motor fuels in the bulk transfer terminal distribution system and who is one of the following:
    - (i) The position holder in a terminal or refinery in this state.
    - (ii) A person who imports motor fuel into this state from a foreign country.
    - (iii) A person who acquires motor fuel from a terminal or refinery in this state from a position holder pursuant to a two party exchange.
    - (iv) The position holder in a terminal or refinery outside this state with respect to motor fuel that that person imports into this state on the account of that person.
  - (b) Includes a permissive supplier unless specifically provided otherwise. Supplier does not include a terminal operator merely because the terminal operator handles motor fuel consigned to the terminal operator within a terminal.
31. "Terminal" means a storage and distribution facility for motor fuel, which is supplied by pipeline or marine vessel, that is registered as a qualified terminal by the United States internal revenue service and from which motor fuel may be removed at a rack.
32. "Terminal bulk transfer" includes the following:
  - (a) A marine barge movement of motor fuel from a refinery or terminal to a terminal.
  - (b) Pipeline movements of motor fuel from a refinery or terminal to a terminal.
33. "Terminal operator" means any person who owns, operates or otherwise controls a terminal and who does not use a substantial portion of the motor fuel that is transferred through or stored in the terminal for the person's own use or consumption or in the manufacture of products other than motor fuel. A terminal operator may own the motor fuel that is transferred through or stored in the terminal.
34. "Transmix" means the buffer or interface between two different products in a pipeline shipment or a mix of two different products within a refinery or terminal that results in an off-grade mixture that is not usable or salable as motor fuel.
35. "Two party exchange" means a transaction:
  - (a) In which motor fuel is transferred from one licensed supplier or licensed permissive supplier to another licensed supplier or licensed permissive supplier.
  - (b) That includes a transfer from the person that holds the original inventory position for motor fuel in the terminal as reflected on the records of the terminal operator.
  - (c) That is simultaneous with removal from the terminal by the receiving exchange party.
  - (d) In which the terminal operator in the terminal operator's books and records treats the receiving exchange party as the supplier that removes the product across a terminal rack for purposes of reporting the events to the department.
36. "Use" includes the placing of fuel into any receptacle on a motor vehicle from which fuel is supplied for the propulsion of the vehicle unless the operator of the vehicle establishes to the satisfaction of the director that the fuel was consumed for a purpose other than to propel a motor vehicle on a highway in this state



and, with respect to fuel brought into this state in any such receptacle on a use class motor vehicle, the consumption of the fuel in this state. A person who places fuel in a receptacle on a use class motor vehicle of another is not deemed to have used the fuel.

37. "Use class motor vehicle" means a motor vehicle that uses use fuel on a highway in this state and that is a road tractor, truck tractor, truck or passenger carrying vehicle having a declared gross vehicle weight of more than twenty-six thousand pounds or having more than two axles.
38. "Use fuel" includes all gases and liquids used or suitable for use to propel motor vehicles, except fuels that are subject to the motor vehicle fuel tax imposed by this article.
39. "User" includes a person who, within the meaning of the term use as defined in this section, uses fuel in a use class motor vehicle.
40. "Vendor" includes a person who sells use fuel in this state and who places the fuel or causes the fuel to be placed into any receptacle on a motor vehicle from which receptacle fuel is supplied for the propulsion, including a service station dealer, a broker and a user who sells use fuel to others.

#### **A.R.S. § 41-4001. Definitions**

In this chapter, unless the context otherwise requires:

1. "Accessory structure" means the installation, assembly, connection or construction of any one-story habitable room, storage room, patio, porch, garage, carport, awning, skirting, retaining wall, evaporative cooler, refrigeration air conditioning system, solar system or wood decking attached to a new or used manufactured home, mobile home or factory-built building.
2. "Act" means the national manufactured housing construction and safety standards act of 1974 and title VI of the housing and community development act of 1974 (P.L. 93-383, as amended by P.L. 95-128, 95-557, 96-153 and 96-339).
3. "Alteration":
  - (a) Means the replacement, addition, modification or removal of any equipment or installation after the sale by a manufacturer to a dealer or distributor but before the sale by a dealer to a purchaser, which may affect compliance with the standards, construction, fire safety, occupancy, plumbing or heat-producing or electrical system.
  - (b) Does not include:
    - (i) The repair or replacement of a component or appliance requiring plug-in to an electrical receptacle if the replaced item is of the same configuration and rating as the component or appliance being repaired or replaced.
    - (ii) The addition of an appliance requiring plug-in to an electrical receptacle if the appliance is not provided with the unit by the manufacturer and the rating of the appliance does not exceed the rating of the receptacle to which the appliance is connected.
4. "Board" means the board of manufactured housing.

5. "Broker" means any person who acts as an agent for the sale or exchange of a used manufactured home or mobile home except as exempted in section 41-4028.
6. "Certificate" means a numbered or serialized label or seal that is issued by the director as certification of compliance with this chapter.
7. "Closed construction" means any building, building component, assembly or system manufactured in such a manner that concealed parts or processes of manufacture cannot be inspected before installation at the building site without disassembly, damage or destruction.
8. "Commercial" means a building with a use-occupancy classification other than single-family dwelling.
9. "Component" means any part, material or appliance that is built-in as an integral part of the unit during the manufacturing process.
10. "Consumer" means either a purchaser or seller of a unit regulated by this chapter who uses the services of a person licensed by the department.
11. "Consummation of sale" means that a purchaser has received all goods and services that the dealer or broker agreed to provide at the time the contract was entered into, the transfer of title or the filing of an affidavit of affixture, if applicable, to the sale. Consummation of sale does not include warranties.
12. "Dealer" means any person who sells, exchanges, buys, offers or attempts to negotiate or who acts as an agent for the sale or exchange of factory-built buildings, manufactured homes or mobile homes except as exempted in section 41-4028. A lease or rental agreement by which the user acquired ownership of the unit with or without additional remuneration is considered a sale under this chapter.
13. "Defect" means any defect in the performance, construction, components or material of a unit that renders the unit or any part of the unit unfit for the ordinary use for which it was intended.
14. "Department" means the Arizona department of housing.
15. "Director" means the director of the department.
16. "Earnest monies" means all monies given by a purchaser or a financial institution to a dealer or broker before consummation of the sale.
17. "Factory-built building":
  - (a) Means a residential or commercial building that is:
    - (i) Either wholly or in substantial part manufactured at an off-site location and transported for installation or completion, or both, on-site.
    - (ii) Constructed in compliance with adopted codes, standards and procedures.
    - (iii) Installed temporarily or permanently.
  - (b) Does not include a manufactured home, recreational vehicle, panelized commercial building using open construction, panelized residential building using open or closed construction or domestic or light commercial storage building.
18. "HUD" means the United States department of housing and urban development.
19. "Imminent safety hazard" means an imminent and unreasonable risk of death or severe personal injury.
20. "Installation" means:

- (a) Connecting new or used mobile homes, manufactured homes or factory-built buildings to on-site utility terminals or repairing these utility connections.
  - (b) Placing new or used mobile homes, manufactured homes, accessory structures or factory-built buildings on foundation systems or repairing these foundation systems.
  - (c) Providing ground anchoring for new or used mobile homes or manufactured homes or repairing the ground anchoring.
21. "Installer" means any person who engages in the business of performing installations of manufactured homes, mobile homes or factory-built buildings.
22. "Installer of accessory structures" means any person who engages in the business of installing accessory structures.
23. "Listing agreement" means a document that contains the name and address of the seller, the year, manufacturer and serial number of the listed unit, the beginning and ending dates of the time period that the agreement is in force, the name of the lender and lien amount, if applicable, the price the seller is requesting for the unit, the commission to be paid to the licensee and the signatures of the sellers and the licensee who obtains the listing.
24. "Local enforcement agency" means a zoning or building department of a city, town or county or its agents.
25. "Manufactured home" means a structure built in accordance with the act.
26. "Manufacturer" means any person that is engaged in manufacturing, assembling or reconstructing any unit regulated by this chapter.
27. "Mobile home" means a structure built before June 15, 1976, on a permanent chassis, capable of being transported in one or more sections and designed to be used with or without a permanent foundation as a dwelling when connected to on-site utilities. Mobile home does not include recreational vehicles and factory-built buildings.
28. "Office" means the office of manufactured housing within the department.
29. "Open construction" means any building, building component, assembly or system manufactured in such a manner that all portions can be readily inspected at the building site without disassembly, damage or destruction.
30. "Purchaser" means a person purchasing a unit in good faith from a licensed dealer or broker for purposes other than resale.
31. "Qualifying party" means a person who is an owner, employee, corporate officer or partner of the licensed business and who has active and direct supervision of and responsibility for all operations of that licensed business.
32. "Reconstruction" means construction work performed for the purpose of restoration or modification of a unit by changing or adding structural components or electrical, plumbing or heat or air producing systems.
33. "Recreational vehicle" means a vehicular type unit that is:
- (a) A portable camping trailer mounted on wheels and constructed with collapsible partial sidewalls that fold for towing by another vehicle and unfold for camping.

- (b) A motor home designed to provide temporary living quarters for recreational, camping or travel use and built on or permanently attached to a self-propelled motor vehicle chassis or on a chassis cab or van that is an integral part of the completed vehicle.
  - (c) A park trailer built on a single chassis, mounted on wheels and designed to be connected to utilities necessary for operation of installed fixtures and appliances and has a gross trailer area of not less than three hundred twenty square feet and not more than four hundred square feet when it is set up, except that it does not include fifth wheel trailers.
  - (d) A travel trailer mounted on wheels, designed to provide temporary living quarters for recreational, camping or travel use, of a size or weight that may or may not require special highway movement permits when towed by a motorized vehicle and has a trailer area of less than three hundred twenty square feet. This subdivision includes fifth wheel trailers. If a unit requires a size or weight permit, it shall be manufactured to the standards for park trailers in a 119.5 of the American national standards institute code.
  - (e) A portable truck camper constructed to provide temporary living quarters for recreational, travel or camping use and consisting of a roof, floor and sides designed to be loaded onto and unloaded from the bed of a pickup truck.
34. "Residential" means a building with a use-occupancy classification of a single-family dwelling or as governed by the international residential code.
35. "Salesperson" means any person who, for a salary, commission or compensation of any kind, is employed by or acts on behalf of any dealer or broker of manufactured homes, mobile homes or factory-built buildings to sell, exchange, buy, offer or attempt to negotiate or act as an agent for the sale or exchange of an interest in a manufactured home, mobile home or factory-built building.
36. "Seller" means a natural person who enters into a listing agreement with a licensed dealer or broker for the purpose of resale.
37. "Site development" means the development of an area for the installation of the unit's or units' locations, parking, surface drainage, driveways, on-site utility terminals and property lines at a proposed construction site or area.
38. "Statutory agent" means a person who is on file with the corporation commission as the statutory agent.
39. "Title transfer" means a true copy of the application for title transfer that is stamped or validated by the appropriate government agency.
40. "Unit" means a manufactured home, mobile home, factory-built building or accessory structures.
41. "Used unit" means any unit that is regulated by this chapter and that has been sold, bargained, exchanged or given away from a purchaser who first acquired the unit that was titled in the name of that purchaser.
42. "Workmanship" means a minimum standard of construction or installation reflecting a journeyman quality of the work of the various trades.

[23 CFR 658.5 Definitions](#)

## **Other Applicable Rules**

[A.A.C. R17-5-202 through R17-5-209](#)

[23 CFR 658](#)

[23 CFR 658, Appendix A](#)

[23 CFR 658, Appendix C](#)

[49 CFR 393](#)

**DEPARTMENT OF REVENUE**  
Title 15, Chapter 3, Article 4



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - FIVE-YEAR REVIEW REPORT

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 3, 2023

**SUBJECT: DEPARTMENT OF REVENUE**  
Title 15, Chapter 3, Article 4

---

### **Summary**

This five year review report (5YRR) from the Arizona Department of Revenue covers eight (8) rules in Title 15, Chapter 3, Article 4, Tax on Alcoholic Beverages. The rules in Article 4 establish tax return filing requirements for malt liquor wholesalers, spirituous or vinous liquor wholesalers, microbreweries, farm wineries, and beer manufacturers; a metric conversion to compute luxury tax on alcoholic beverages; filing requirements for a primary source of supply; and the Department's procedure for failure to report purchases or file a tax return.

### **Proposed Action**

The rules were last amended in January 2009 and the Department has proposed no course of action until the expiration of the Governor's rulemaking moratorium. When that time occurs, the Department proposes to amend the incorrect or outdated reference to statute or rule in the following rules: R15-3-401, R15-3-403, R15-3-404.

Council staff emailed the Department on April 11, 2023 regarding the timeliness of the proposed rulemaking and recommended updating the report with a different timeline. At the time of drafting this memorandum, council staff has not received a response from the Department. Council staff recommend the Council speak with the Department regarding their proposed timeline.

**1. Has the agency analyzed whether the rules are authorized by statute?**

The Department cites both general and specific statutory authority for these rules.

**2. Summary of the agency's economic impact comparison and identification of stakeholders:**

According to the Department, the economic impact of the tax regulatory scheme is generally derived from the statutes themselves and not the rules adopted to interpret the application of a tax. It is only when a rule imposes requirements not specifically required by statute (e.g., to prepare a form, submit documentation, or maintain records) that the rule has an economic impact.

For Fiscal Year 2021-22, liquor collections accounted for approximately 19.97% of gross luxury tax collections, with net liquor collections totaling \$88,925,043.09.

Stakeholders include the Department and liquor wholesalers and manufacturers.

**3. Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

In the Department's previous five-year-review report, the Department decided certain rules contained an incorrect or outdated reference to a statute or rule. The Department anticipated submitting the amended rules to the Governor's Regulatory Review Council within twelve months of the expiration of the Governor's rulemaking moratorium. The moratorium is still in effect, as a result the rules have not been amended.

According to the Department, once these rules are amended, the probable benefits of all the rules within this state will outweigh the probable costs and all the rules will impose the least burden and costs to persons regulated by them, including paperwork and other costs necessary to achieve the underlying regulatory objective.

**4. Has the agency received any written criticisms of the rules over the last five years?**

The Department indicates that they have not received any written criticisms of the rules in the last five years.

**5. Has the agency analyzed the rules' clarity, conciseness, and understandability?**

The Department states that the rules are generally clear, concise, and understandable, with the following exceptions:

R15-3-401: This rule fails to address cider wholesalers



R15-3-403: This rule fails to mention craft distillers and direct shipment licensees; it also refers to “farm winery license” as “domestic farm winery license”, and “domestic microbrewery license” as “microbrewery license.” This is an issue because the word domestic is no longer used in the underlying statute.

R15-3-404: This rule fails to mention craft distillers and direct shipment licensees; it also refers to “farm winery license” as “domestic farm winery license”, and “domestic microbrewery license” as “microbrewery license.” This is an issue because the word domestic is no longer used in the underlying statute.

#### **6. Has the agency analyzed the rules’ consistency with other rules and statutes?**

The Department indicates that the rules are generally consistent with other rules and statutes with the following exceptions:

R15-3-401: This rule is partially consistent with A.R.S. § 42-3353 as it includes “cider” wholesalers, which are not addressed in this rule or in any other rule.

R15-3-403: This rule is partially consistent with A.R.S. § 42-3355 as it was amended to include “craft distillers” “direct shipment licensees”; A.R.S. § 4-205.04 as it was amended to rename “domestic farm winery license” to “farm winery license”; A.R.S. § 4-205.08 as it was amended to rename “domestic microbrewery license” to “microbrewery license” ; A.R.S. § 42-3355 as it was amended to remove the word “domestic” in accordance with the license name changes in A.R.S. §§ 4-205.04 and 4-205.08.

R15-3-404: This rule is partially consistent with A.R.S. § 42-3355 as it was amended to include “craft distillers” “direct shipment licensees”; A.R.S. § 4-205.04 as it was amended to rename “domestic farm winery license” to “farm winery license”; A.R.S. § 4-205.08 as it was amended to rename “domestic microbrewery license” to “microbrewery license” ; A.R.S. § 42-3355 as it was amended to remove the word “domestic” in accordance with the license name changes in A.R.S. §§ 4-205.04 and 4-205.08.

#### **7. Has the agency analyzed the rules’ effectiveness in achieving its objectives?**

The Department states the rules are generally effective in achieving its objectives with the following exceptions:

R15-3-401: This rule is partially effective because it fails to address cider wholesalers

R15-3-403: This rule is partially effective because it fails to address craft distillers and direct shipment licensees

R15-3-404: This rule is partially effective because it fails to address craft distillers and direct shipment licensees

**8. Has the agency analyzed the current enforcement status of the rules?**

The Department states that the rules are enforced as written.

**9. Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Department indicates that the rules are not more stringent than corresponding federal law as there are no corresponding federal statutes.

**10. For rules adopted after July 29, 2010, do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Department indicates that none of the rules require the issuance of a regulatory permit, license or agency authorization, and none of the rules were adopted after July 29, 2010.

**11. Conclusion**

As stated above, the Department indicates that the rules are generally clear, concise, and understandable and enforced as written. The Department has no plans to amend the rules until the expiration of the rulemaking moratorium. Although the report meets the requirements of A.R.S. § 41-1056, Council staff encourages the Council to discuss the proposed course of action timeline with the Department as the rulemaking moratorium is now memorialized in statute under ARS § 41-1039 and the Department identified amendments that need to be made in their report.

**STATE OF ARIZONA**  
*Department of Revenue*



*Katie Hobbs*  
**Governor**

*Robert Woods*  
**Director**

March 2, 2023

Nicole Sornsin, Chair  
Governor's Regulatory Review Council  
Arizona Department of Administration  
100 North 15<sup>th</sup> Avenue, Room 402  
Phoenix, Arizona 85007

**Re:** Five Year Review Report of Title 15, Chapter 3, Article 4

Dear Ms. Sornsin:

The enclosed report is a summarization of the five-year rule review undertaken by the Department of Revenue covering the administrative rules in Title 15, Chapter 3, Article 4. The review was conducted pursuant to A.R.S. § 41-1056.

This report is the result of the review and analysis of existing rules and statutory provisions pertaining to luxury tax on alcoholic beverages. The Department certifies that it is in compliance with A.R.S. § 41-1091.

If you have any questions, please contact Howard Cohen via email at [HCohen@azdor.gov](mailto:HCohen@azdor.gov). Thank you for your consideration.

Sincerely,

Hsin Pai  
General Counsel (as designate to Director Woods)  
Arizona Department of Revenue

Enclosures

**Governor’s Regulatory Review Council**  
**Five-Year-Review Report 2023**  
**Luxury Tax Section**  
**A.A.C. Title 15, Chapter 3, Article 4**

**1. Authorization of the rule by existing statutes**

General Statutory Authority:

- A.R.S. § 42-1005
- A.R.S. § 42-3004

Specific Statutory Authority:

- R15-3-401 Tax Return Filing Requirements for a Malt Liquor Wholesaler: A.R.S. § 42-3353
- R15-3-402 Tax Return Filing Requirements for a Spirituous or Vinous Liquor Wholesaler: A.R.S. § 42-3354
- R15-3-403 Tax Return Filing Requirements for a Domestic Microbrewery, Domestic Farm Winery, or Beer Manufacturer: A.R.S. § 42-3355
- R15-3-404 Taxes Remitted: A.R.S. §§ 4-205.04, 4-205.08, 42-5023, and 42-5061
- R15-3-405 Alcoholic Beverage Samples: A.R.S. §§ 42-3051 and 42-3052
- R15-3-406 Metric Conversion: A.R.S. §§ 42-3003 and 42-3052
- R15-3-408 Failure to Report Purchases from a Primary Source of Supply: A.R.S. §§ 4-243.01, 42-2003, and 42-3003
- R15-3-410 Failure to File a Return or Pay Tax: A.R.S. §§ 4-243.01, 42-2003, and 42-3003

**2. The objective of each rule:**

Rule	Objective
R15-3-401	This rule provides the information that malt liquor wholesalers are required to file on their monthly returns.
R15-3-402	This rule provides the information that spirituous and vinous liquor wholesalers are required to file on their monthly returns.
R15-3-403	This rule provides the information that domestic microbreweries, domestic farm wineries, and beer manufacturers are required to file on their monthly returns.

R15-3-404	This rule provides that all domestic farm wineries and domestic microbreweries required under A.R.S. Title 4 to remit transaction privilege tax should do so under the retail classification on gross receipts from sales, regardless of business location.
R15-3-405	This rule provides that alcoholic beverage samples are subject to luxury tax unless otherwise statutorily exempt.
R15-3-406	This rule provides the method of computing the luxury tax for alcoholic beverages sold in metric units.
R15-3-408	This rule provides that ADOR will report to the Arizona Department of Liquor Licenses and Control any Arizona wholesalers that fail to provide copies of all invoices for alcoholic beverages purchased from a primary source of supply,
R15-3-410	This rule provides that ADOR will report to the Arizona Department of Liquor Licenses and Control any licensee that fails to file a return or pay tax and will request that Arizona Department of Liquor Licenses and Control take any applicable action authorized under A.R.S. Title 4.

3. **Are the rules effective in achieving their objectives?** Yes \_\_\_ No X

*If not, please identify the rule(s) that is not effective and provide an explanation for why the rule(s) is not effective.*

Rule	Explanation
15-3-401	This rule is only partially effective because it fails to address cider wholesalers, who currently file in the same manner as malt liquor wholesalers due to statutory changes to the underlying statute A.R.S. § 42-3353.
15-3-403	This rule is only partially effective because it fails to address craft distillers and direct shipment licensees, who currently file in the same manner as microbreweries, farm wineries, and beer manufacturers due to statutory changes to the underlying statute A.R.S. § 42-3355.
15-3-404	This rule is only partially effective because it fails to address craft distillers and direct shipment licensees, who currently file in the same manner as microbreweries, farm wineries, and beer manufacturers due to statutory changes to the underlying statute A.R.S. § 42-3355.

4. **Are the rules consistent with other rules and statutes?** Yes \_\_\_ No X

*If not, please identify the rule(s) that is not consistent. Also, provide an explanation and identify the provisions that are not consistent with the rule.*

Rule	Explanation
15-3-401	This rule is partially consistent with A.R.S. § 42-3353. A.R.S. § 42-3353 was amended in 2014 to include “cider” wholesalers. “Cider” wholesalers are not addressed in this rule or in any other rule.
15-3-403	This rule is partially consistent with A.R.S. § 42-3355. The rule’s underlying statute, A.R.S. § 42-3355, was amended in 2014 to include “craft distillers” and in 2016 to include “direct shipment licensees.” A.R.S. § 4-205.04 was amended in 2014 to rename “domestic farm winery license” to “farm winery license.” A.R.S. § 4-205.08 was amended in 2014 to rename “domestic microbrewery license” to “microbrewery license.” Thus, A.R.S. § 42-3355 was also amended to remove the word “domestic” in accordance with the license name changes in A.R.S. §§ 4-205.04 and 4-205.08.
15-3-404	This rule is partially consistent with A.R.S. § 42-3355. The rule’s underlying statute, A.R.S. § 42-3355, was amended in 2014 to include “craft distillers” and in 2016 to include “direct shipment licensees.” A.R.S. § 4-205.04 was amended in 2014 to rename “domestic farm winery license” to “farm winery license.” A.R.S. § 4-205.08 was amended in 2014 to rename “domestic microbrewery license” to “microbrewery license.” Thus, A.R.S. § 42-3355 was also amended to remove the word “domestic” in accordance with the license name changes in A.R.S. §§ 4-205.04 and 4-205.08.

5. **Are the rules enforced as written?** Yes X No    

*If not, please identify the rule(s) that is not enforced as written and provide an explanation of the issues with enforcement. In addition, include the agency’s proposal for resolving the issue.*

Rule	Explanation
------	-------------

6. **Are the rules clear, concise, and understandable?** Yes     No X

*If not, please identify the rule(s) that is not clear, concise, or understandable and provide an explanation as to how the agency plans to amend the rule(s) to improve clarity, conciseness, and understandability.*

Rule	Explanation
15-3-401	Although generally concise and understandable, this rule is unclear in that it fails to address cider wholesalers.
15-3-403	Although generally concise and understandable, this rule is unclear in that it fails to mention craft distillers and direct shipment licensees. Moreover, the rule refers to “farm winery license” as “domestic farm winery license”, and “domestic microbrewery license”

	as “microbrewery license.” The inclusion of the word domestic may lead to lack of clarity, because it is no longer used in the underlying statute.
15-3-404	Although generally concise and understandable, this rule is unclear in that it fails to mention craft distillers and direct shipment licensees. Moreover, the rule refers to “farm winery license” as “domestic farm winery license”, and “domestic microbrewery license” as “microbrewery license.” The inclusion of the word domestic may lead to lack of clarity, because it is no longer used in the underlying statute.

7. **Has the agency received written criticisms of the rules within the last five years?** Yes \_\_\_ No X

*If yes, please fill out the table below:*

Commenter	Comment	Agency’s Response

8. **Economic, small business, and consumer impact comparison:**

Generally, the economic impact of the tax regulatory scheme is derived from the statutes themselves and not the rules adopted to interpret the application of a tax. It is only when a rule imposes requirements not specifically required by statute (e.g., to prepare a form, submit documentation, or maintain records) that the rule has an economic impact.

For Fiscal Year 2021-22, liquor collections accounted for approximately 19.97% of gross luxury tax collections, with net liquor collections totaling \$88,925,043.09.

9. **Has the agency received any business competitiveness analyses of the rules?** Yes \_\_\_ No X

ADOR has not received any analysis that compares the rules’ impact on this state’s business competitiveness to the impact on businesses in other states during the past five years.

10. **Has the agency completed the course of action indicated in the agency’s previous five-year-review report?**

*Please state what the previous course of action was and if the agency did not complete the action, please explain why not.*

In ADOR’s previous five-year-review report, ADOR decided certian rules contained an incorrect or outdated reference to a statute or rule. ADOR anticipated submitting the amended rules to the Governor’s Regulatory Review Council within twelve months of the expiration of the Governor’s rulemaking moratorium. The moratorium is still in effect, as a result the rules were not amended.

11. **A determination that the probable benefits of the rule outweigh within this state the probable costs of the rule, and the rule imposes the least burden and costs to regulated persons by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective:**

Once the specific rules mentioned are amended, the probable benefits of all the rules within this state will outweigh the probable costs and all the rules will impose the least burden and costs to persons regulated by them, including paperwork and other costs necessary to achieve the underlying regulatory objective.

12. **Are the rules more stringent than corresponding federal laws?** Yes \_\_\_ No X

*Please provide a citation for the federal law(s). And if the rule(s) is more stringent, is there statutory authority to exceed the requirements of federal law(s)?*

The rules are based on state law. There are no federal statutes or regulations with which the rules would be compared for stringency.

13. **For rules adopted after July 29, 2010 that require the issuance of a regulatory permit, license, or agency authorization, whether the rules are in compliance with the general permit requirements of A.R.S. § 41-1037 or explain why the agency believes an exception applies:**

None of the rules require the issuance of a regulatory permit, license or agency authorization, and none of the rules were adopted after July 29, 2010.

14. **Proposed course of action**

*If possible, please identify a month and year by which the agency plans to complete the course of action.*

ADOR proposes no changes to the following rules:

- R15-3-402 Tax Return Filing Requirements for a Spirituous or Vinous Liquor Wholesaler
- R15-3-405 Alcoholic Beverage Samples
- R15-3-406 Metric Conversion
- R15-3-408 Failure to Report Purchases from a Primary Source of Supply
- R15-3-410 Failure to File a Return or Pay Tax

The following rules contain an incorrect or outdated reference to a statute or rule. ADOR anticipates submitting the amended rules to the Governor's Regulatory Review Council within twelve months of the expiration of the Governor's rulemaking moratorium.

- R15-3-401 Tax Return Filing Requirements for a Malt Liquor Wholesaler



- R15-3-403 Tax Return Filing Requirements for a Domestic Microbrewery, Domestic Farm Winery, or Beer Manufacturer
- R15-3-404 Taxes Remitted

## CHAPTER 3. DEPARTMENT OF REVENUE - LUXURY TAX SECTION

Repealed effective June 20, 1990 (Supp. 90-2).

**R15-3-321. Renumbered****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Former Section R15-3-321 renumbered to R15-3-315 effective June 20, 1990 (Supp. 90-2).

**R15-3-322. Renumbered****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Former Section R15-3-322 renumbered to Section R15-3-316 effective June 20, 1990 (Supp. 90-2).

**ARTICLE 4. TAX ON ALCOHOLIC BEVERAGES****R15-3-401. Tax Return Filing Requirements for a Malt Liquor Wholesaler**

On or before the statutory deadline each month, each wholesaler of malt liquor shall file a return on a form prescribed by the Department. The return shall show the following:

1. Taxpayer's name, mailing address, business address, liquor license number issued by the Department of Liquor Licenses and Control, and identification number;
2. The itemized quantity of malt liquor purchased during the month the tax accrued, listed by supplier and invoice number;
3. The itemized quantity of tax-free sales of malt liquor during the month the tax accrued, listed by purchaser and invoice number;
4. The itemized quantity of out-of-state sales of malt liquor during the month the tax accrued, listed by purchaser and invoice number;
5. The itemized quantity of malt liquor purchased from other licensed Arizona wholesalers during the month the tax accrued, listed by supplier and invoice number;
6. The total quantity of malt liquor purchased in Arizona during the month the tax accrued;
7. The amount of luxury tax accrued during the month; and
8. Supporting documentation for the information provided in the return.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended effective July 23, 1985 (Supp. 85-4). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-402. Tax Return Filing Requirements for a Spirituous or Vinous Liquor Wholesaler**

On or before the statutory deadline each month, each spirituous or vinous liquor wholesaler shall file a return on a form prescribed by the Department. The return shall show the following:

1. Taxpayer's name, mailing address, business address, liquor license number issued by the Department of Liquor Licenses and Control, and identification number;
2. The itemized quantity of spirituous or vinous liquor sold during the month the tax accrued, listed by purchaser and invoice number;
3. The itemized quantity of spirituous or vinous liquor received during the month the tax accrued, listed by supplier and invoice number;
4. The total quantity of spirituous or vinous liquor available at the beginning and at the end of the month the tax accrued;

5. The itemized quantity of tax-free sales of spirituous or vinous liquor during the month the tax accrued, listed by purchaser and invoice number;
6. The itemized quantity of out-of-state sales of spirituous or vinous liquor during the month the tax accrued, listed by purchaser and invoice number;
7. The itemized quantity of spirituous or vinous liquor sold to other licensed Arizona wholesalers during the month the tax accrued, listed by purchaser and invoice number;
8. The total quantity of spirituous or vinous liquor sold in Arizona during the month the tax accrued;
9. The amount of luxury tax accrued during the month; and
10. Supporting documentation for the information provided in the return.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended effective July 23, 1985 (Supp. 85-4). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-403. Tax Return Filing Requirements for a Domestic Microbrewery, Domestic Farm Winery, or Beer Manufacturer**

On or before the statutory deadline each month, each domestic microbrewery, domestic farm winery, or beer manufacturer subject to A.R.S. § 42-3355 shall file a return on a form prescribed by the Department. The return shall show the following:

1. Taxpayer's name, mailing address, business address, liquor license number issued by the Department of Liquor Licenses and Control, and identification number;
2. The itemized quantity of tax-free sales to Arizona purchasers during the month the tax accrued, listed by purchaser and invoice number;
3. For taxpayers filing for locations physically within the state, the itemized quantity of out-of-state sales during the month the tax accrued, listed by purchaser and invoice number;
4. The itemized quantity of beer, malt liquor, or vinous liquor sold to other licensed Arizona wholesalers during the month the tax accrued, listed by purchaser and invoice number;
5. The total quantity of beer, malt liquor, or vinous liquor sold to Arizona purchasers during the month the tax accrued;
6. The amount of luxury tax accrued during the month; and
7. Supporting documentation for the information provided in the return.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Section repealed; new Section adopted by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-404. Taxes Remitted**

Any domestic farm winery or domestic microbrewery required under A.R.S. Title 4, Chapter 2, Article 1 to remit transaction privilege tax shall remit the tax under the retail classification (see 15 A.A.C. 5, Article 1) on its gross receipts from the sale in addition to luxury tax, regardless of its business location.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Section repealed by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). New Section made by final rulemaking at 14 A.A.R. 4410, effective January 3,

## CHAPTER 3. DEPARTMENT OF REVENUE - LUXURY TAX SECTION

2009 (Supp. 08-4).

(Supp. 08-4).

**R15-3-405. Alcoholic Beverage Samples**

Samples of alcoholic beverages, whether intended for personal or commercial use and consumption, and whether provided for a consideration, are subject to luxury tax at the rates prescribed in A.R.S. § 42-3052 unless otherwise exempt under A.R.S. Title 42, Chapter 3.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Section repealed by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). New Section made by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-406. Metric Conversion**

To compute the luxury tax for alcoholic beverages in metric containers, each taxpayer shall multiply the quantity in liters by 0.264172 to determine the equivalent quantity in gallons.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-407. Expired****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4). Section expired under A.R.S. § 41-1056(J) at 24 A.A.R. 2702, effective July 28, 2018 (Supp. 18-3).

**R15-3-408. Failure to Report Purchases from a Primary Source of Supply**

If the Department determines that an Arizona wholesaler failed to transmit to the Department copies of all invoices for alcoholic beverages purchased from any primary source of supply as required by A.R.S. § 4-243.01, the Department shall report the failure to the Department of Liquor Licenses and Control.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4).

**R15-3-409. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Section repealed by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3).

**R15-3-410. Failure to File a Return or Pay Tax**

The Department shall report any failure by a licensee to file a return or pay the tax due to the Department of Liquor Licenses and Control, and the Department shall request that the Department of Liquor Licenses and Control take any applicable action authorized under A.R.S. Title 4.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended by final rulemaking at 5 A.A.R. 3768, effective September 22, 1999 (Supp. 99-3). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009

**ARTICLE 5. ADMINISTRATION****R15-3-501. Filing of Luxury Tax Reports and Returns**

The Department shall deem a report or return required to be filed under A.R.S. Title 42, Chapter 3 or this Chapter timely filed if the taxpayer submits the report or return through the electronic filing system established by the Department on or before the statutory due date.

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended effective June 20, 1990 (Supp. 90-2). Amended by final rulemaking at 14 A.A.R. 4410, effective January 3, 2009 (Supp. 08-4). Amended by exempt rulemaking at 22 A.A.R. 1843, effective June 24, 2016 (Supp. 16-2); when this Section was amended in Supp. 16-2 the preceding historical note was omitted due to a clerical error. The note was added at the request of the Department, file no. R18-90 (Supp. 18-1).

**R15-3-502. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-503. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-504. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-505. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-506. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-507. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-508. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-509. Repealed****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-510. Expired****Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2). Amended effective June 20, 1990 (Supp. 90-2). Section expired under A.R.S. § 41-1056(E) at 9 A.A.R. 4135,

---

CHAPTER 3. DEPARTMENT OF REVENUE - LUXURY TAX SECTION

effective July 31, 2003 (Supp. 03-3).

Repealed effective February 22, 1989 (Supp. 89-1).

**R15-3-511. Repealed**

**R15-3-512. Repealed**

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2).

**Historical Note**

Adopted effective March 18, 1981 (Supp. 81-2).  
Repealed effective February 22, 1989 (Supp. 89-1).

**§ 4-205.04. Farm winery license; issuance; regulatory provisions; retail site; fee**

A. The director may issue a farm winery license to any person who meets the requirements of subsection C of this section. Each location that engages in producing or manufacturing these products must obtain a separate farm winery license. The licensee may not transfer the farm winery license from person to person or from location to location.

B. An applicant for a farm winery license, at the time of filing the application for the license, shall accompany the application with the license fee. A person who holds a farm winery license shall report annually at the end of each calendar year, at the time and in the manner as the director prescribes, the amount of wine produced or manufactured by the licensee during the calendar year. In addition to any provision of this title, if the total amount of wine produced or manufactured during the year exceeds the amount permitted annually by the license, the licensee shall apply for and receive a producer's license only on surrender of the farm winery license or licenses.

C. A person may be licensed as a farm winery to sell wine produced or manufactured if in a calendar year it produces at least two hundred gallons and not more than forty thousand gallons of wine and if the winery either holds a winery permit issued by the United States alcohol and tobacco tax and trade bureau or has a contract pursuant to subsection D of this section for the production or manufacturing of wine from grapes or other fruit grown on at least five producing acres of land owned or controlled by the applicant and the land has been devoted to fruit growing for at least three consecutive calendar years. A licensed farm winery may make sales and deliveries of wine only as specifically provided in this section and as follows:

1. A licensed farm winery may make sales and deliveries of wine to wholesalers licensed to sell wine under this title.
2. A licensed farm winery may serve wine produced or manufactured on the premises for the purpose of sampling the wine. The wine may include wine produced pursuant to subsection D of this section and section 4-243.03.
3. A representative of the licensed farm winery may consume small amounts of the products of the licensed farm winery on the premises for the purpose of sampling the wine. The wine may include wine produced pursuant to subsection D of this section and section 4-243.03.
4. A licensed farm winery may sell to a consumer physically present on the premises wine produced or manufactured on the premises in the original container for consumption on or off the premises. The wine may include

**ARS 4-205.04 Farm winery license; issuance; regulatory provisions; retail site; fee (Arizona Revised Statutes (2023 Edition))**

---

wine produced pursuant to subsection D of this section and section 4-243.03.

5. A licensed farm winery may purchase and sell wine produced, packaged and labeled by another licensed farm winery for sampling and consumption on or off the premises only if the retail sale is to a consumer physically present on the premises of the farm winery, except that the sales of wine produced, packaged and labeled by another winery may not exceed twenty percent of the farm winery's sales by volume. The percentage limitation shall not apply to wine produced pursuant to subsection D of this section and section 4-243.03.

6. If the licensed farm winery is not otherwise engaged in the business of a distiller, vintner, brewer, rectifier, blender or other producer of spirituous liquor in any jurisdiction, the licensed farm winery may hold licenses prescribed in section 4-209, subsection B, paragraph 12 on the licensed farm winery premises or other retail premises. Except as provided in paragraph 5 of this subsection, the licensed farm winery shall purchase all other spirituous liquor for sale at the on-sale retail premises from wholesalers that are licensed in this state, except that a licensed farm winery may:

(a) Purchase wine from other farm wineries pursuant to paragraph 7 of this subsection.

(b) Make deliveries of the wine that the farm winery produces to the farm winery's own commonly controlled retail licensed premises.

7. A licensed farm winery that produces not more than twenty thousand gallons of wine in a calendar year may make sales and deliveries of the wine that the licensed farm winery produces to on-sale and off-sale retailers.

8. Notwithstanding section 4-244, paragraphs 3 and 7, an on-sale or off-sale retailer may purchase and accept delivery of wine from a licensed farm winery pursuant to paragraph 7 of this subsection.

9. A licensed farm winery that produces not more than twenty thousand gallons of wine in a calendar year may make sales and deliveries of wine that the licensed farm winery produces to consumers off of the licensed premises and that is ordered by telephone, mail, fax or catalogue, through the internet or by other means if all of the following apply:

(a) The purchaser of the wine provided the licensed farm winery with verification of the purchaser's legal age to purchase alcohol.

**ARS 4-205.04 Farm winery license; issuance; regulatory provisions; retail site; fee (Arizona Revised Statutes (2023 Edition))**

---

(b) The shipping container in which the wine is shipped is marked to require the signature on delivery of an adult who is of legal age to purchase alcohol and delivery confirmation.

(c) The wine is for personal use only and not for resale.

(d) The wine is delivered by the licensed farm winery or shipped by the licensed farm winery by a common carrier to a residential or business address other than a premises licensed pursuant to this title.

(e) The purchaser could have carried the wine lawfully into or within this state.

(f) The delivery is made by a person who is at least twenty-one years of age.

(g) The farm winery collects payment for the price of the spirituous liquor not later than at the time of delivery.

10. A licensed farm winery may make sales and deliveries as expressly permitted by sections 4-203.03, 4-203.04 and 4-244.04.

D. A person otherwise qualified to receive a farm winery license may enter into a custom crush arrangement where a licensed winery produces or manufactures wine from grapes or other fruit supplied by the person. The winery receiving the fruit shall be licensed by the United States alcohol and tobacco tax and trade bureau and the department and is responsible for filing all reports that relate to its wine production or manufacturing with the United States alcohol and tobacco tax and trade bureau and the department. Each person supplying the grapes or other fruit shall first apply for and receive a farm winery license and shall report to the department all volumes of wine from its custom crush arrangements, which shall not be allocated to the gallonage of the receiving farm winery if the supplying farm winery has an active basic permit issued by the United States alcohol and tobacco tax and trade bureau.

E. On application by a farm winery licensee, the director may authorize a farm winery licensee to operate up to two remote tasting and retail premises if:

1. The wine sold at the premises is limited to wine produced or manufactured by the licensed farm winery and wines produced or manufactured by other licensed farm wineries, including wines produced or manufactured pursuant to subsection D of this section and section 4-243.03. The farm winery may sell wine to a consumer physically present on the premises for consumption on or off the premises. Sales of wines not produced or manufactured by the farm winery are limited to not more than

**ARS 4-205.04 Farm winery license; issuance; regulatory provisions; retail site; fee (Arizona Revised Statutes (2023 Edition))**

---

twenty percent of the total sales by volume at that location. The percentage limitation shall not apply to wine produced pursuant to subsection D of this section and section 4-243.03.

2. The farm winery licensee:

(a) Remains responsible for the premises.

(b) Obtains approval for the premises from the local governing body before submitting an application to the department. A copy of an order from the local governing body recommending approval of the premises must be filed with the department as part of the application.

(c) Does not sublease the premises.

(d) Has an agent who is a natural person who meets the qualifications of licensure in this state.

(e) Meets the qualifications for a license pursuant to section 4-203, subsection A.

F. A farm winery licensee may hold a craft distiller license issued pursuant to section 4-205.10. The farm winery and craft distiller licensee is subject to all other requirements of this section and section 4-205.10. The farm winery may provide sampling and sales of the distilled spirits pursuant to section 4-205.10, subsection C, paragraphs 2 and 3 on the same premises as the wine sampling and retail sales.

G. The farm winery is liable for any violation committed in connection with any sale or delivery of the wine. The rules adopted by the director pursuant to section 4-203, subsection J apply to the delivery of wine under subsection C, paragraph 9 of this section. An act or omission of any person who makes a sale or delivery of wine for a licensee under subsection C, paragraph 9 of this section is deemed to be an act or omission of the licensee for the purposes of section 4-210, subsection A, paragraph 9.

H. A farm winery that sells or delivers wine pursuant to this section shall:

1. Pay to the department of revenue all luxury taxes imposed pursuant to title 42, chapter 3 and all transaction privilege or use taxes imposed pursuant to title 42, chapter 5.

2. File all returns or reports required by law.

I. A delivery of wine by a farm winery to a purchaser in this state is a transaction deemed to have occurred in this state.



**ARS 4-205.04 Farm winery license; issuance; regulatory provisions; retail site; fee (Arizona Revised Statutes (2023 Edition))**

---

J. The director shall adopt rules in order to administer this section.

K. The director may charge an additional farm winery license fee adopted pursuant to section 4-209 for issuing licenses, authorizations or approvals pursuant to subsections D and E of this section.

L. The farm winery licensee that operates primarily as a remote tasting room premises may exchange the farm winery license for a remote tasting room license without an additional fee, not later than December 31, 2018. The new remote tasting room license must be connected to a farm winery license, with common ownership, that complies with all requirements for a farm winery license pursuant to subsections C and E of this section.

M. Production and storage space of the farm winery is excluded from the licensed farm winery premises and is not the public area unless that space is also used for the sale of wine to the public or consumption of or sampling of wine by the public or to provide other services to the public. Pursuant to section 4-118, the director, the director's agents or any peace officer may inspect spaces excluded by this subsection. For the purposes of this subsection, "public area" means a place within a farm winery that is accessible to the public and in which the farm winery authorizes the presence of members of the public.

**History:**

Amended by L. 2022, ch. 282,s. 2, eff. 9/23/2022. Amended by L. 2019, ch. 136,s. 7, eff. 8/27/2019. Amended by L. 2018, ch. 240,s. 10, eff. 8/3/2018. Amended by L. 2016, ch. 161,s. 6, eff. 8/5/2016. Amended by L. 2014, ch. 253,s. 11, eff. 7/24/2014.

**Related Legislative Provision:**

See L. 2014, ch. 253, s. 37.

**§ 4-205.08. Microbrewery license; issuance; regulatory provisions; retail site**

A. The director may issue a microbrewery license to any microbrewery. Each location that engages in producing, manufacturing and bottling these products must obtain a separate microbrewery license. The licensee may not transfer the microbrewery license from person to person or from location to location.

B. An applicant for a microbrewery license, at the time of filing the application for the license, shall accompany the application with the license fee. Persons holding a microbrewery license shall report annually at the end of each calendar year, at the time and in the manner as the director prescribes, the amount of beer produced or manufactured by them during the calendar year and the amount delivered pursuant to subsection D, paragraph 4, subdivision (b) of this section. If the total amount of beer that is produced or manufactured during the calendar year exceeds the amount permitted annually by the license, the licensee shall apply for and receive a producer's license only on surrender of the microbrewery license or licenses and shall have no continuing rights as a microbrewery under this section. On the surrender of the microbrewery license or licenses, the licensee shall transfer, surrender or otherwise relinquish control of all of its retail licenses located remotely from a microbrewery.

C. Notwithstanding any other law, a licensed microbrewery may:

1. Sell beer produced or manufactured on the premises for consumption on or off the premises.
2. Make sales and deliveries of beer that the microbrewery produces or manufactures to persons licensed to sell beer under this title through wholesalers licensed under this title or as provided in subsection D, paragraph 4, subdivision (a) or (b) of this section.
3. Make sales and deliveries of beer that the microbrewery produces or manufactures to persons licensed to sell beer in another state if lawful under the laws of that state.
4. Serve beer produced or manufactured on the premises for the purpose of sampling the beer.
5. Sell beer produced or manufactured by other microbreweries for consumption only on the premises of the licensee, except that the sales percentage of beer from other microbreweries may not exceed twenty percent of the licensee's annual sales of beer by volume at the premises. If

the other microbrewery has established a distribution relationship with one or more wholesalers who are licensed under this title, the beer shall be purchased through those wholesalers.

6. Maintain at no charge a tapping equipment system of a licensed retailer when the microbrewery sells beer as provided in subsection D, paragraphs 3 and 4 of this section, including cleaning the tapping equipment system and replacing bonnet washers, friction rings, valve stems, hardware, unions, clamps, air tees, screws, tapping devices, tower heads and single air and beer lines.

D. A licensed microbrewery is subject to all of the following requirements:

1. The microbrewery shall produce or manufacture not less than five thousand gallons of beer in each calendar year following the first year of operation.

2. The microbrewery shall not produce or manufacture more than six million two hundred thousand gallons of beer in a calendar year.

3. If retail operations are conducted in conjunction with the microbrewery, the microbrewery may sell other spirituous liquor products if the microbrewery holds an on-sale retail license for a bar, beer and wine bar or restaurant. The microbrewery may be issued up to a combined total of seven retail licenses in this state, whether the premises are located on or adjacent to a microbrewery or remotely from a microbrewery. The limit on the number of retail licenses applies on an aggregated basis to all microbreweries that are under common control of any person with control of the microbrewery.

4. The microbrewery may make sales and deliveries of beer that it has produced or manufactured to both:

(a) Retail licensees that meet the requirements prescribed in paragraph 3 of this subsection in any amount.

(b) Any other retail licensee in a cumulative amount not to exceed ninety-three thousand gallons in total for all licensed retailers in any calendar year.

E. A microbrewery that produces or manufactures more than one million two hundred forty thousand gallons of beer in a calendar year maintains all of the rights associated with a microbrewery license, except that the microbrewery shall not:

**ARS 4-205.08 Microbrewery license; issuance; regulatory provisions; retail site (Arizona Revised Statutes (2023 Edition))**

---

1. Apply for or receive a retail license pursuant to subsection D, paragraph 3 of this section for premises that are located remotely from the microbrewery.
  2. Make sales or deliveries of beer that the microbrewery has produced or manufactured to any retail licensee as provided in subsection D, paragraph 4 of this section, except for the microbrewery's retail licensees on or adjacent to the microbrewery.
- F. The gallonage amounts prescribed in subsection D, paragraph 2 and subsection E of this section apply to the aggregate manufacture or production of all microbreweries that are under common control of any person with control of the microbrewery.
- G. A microbrewery that is otherwise engaged as a distiller, vintner, brewer, rectifier, blender or other producer of spirituous liquor in any jurisdiction is prohibited from holding any retail license that is located remotely from a microbrewery. This subsection does not prohibit a person with control of more than one microbrewery from conducting retail operations remotely from a microbrewery pursuant to subsection D, paragraph 3 of this section.
- H. A microbrewery that sells or delivers beer pursuant to this section shall:
1. Pay to the department of revenue all luxury taxes imposed pursuant to title 42, chapter 3 and all transaction privilege or use taxes imposed pursuant to title 42, chapter 5.
  2. File all returns or reports required by law.
- I. A delivery of beer by a microbrewery to a purchaser in this state is a transaction deemed to have occurred in this state.
- J. The director shall adopt rules to administer this section.

**History:**

Amended by L. 2022, ch. 282, s. 3, eff. 9/23/2022. Amended by L. 2018, ch. 240, s. 11, eff. 8/3/2018. Amended by L. 2015, ch. 131, s. 1, eff. 7/2/2015. Amended by L. 2014, ch. 253, s. 13, eff. 7/24/2014.

**§ 42-1005. Powers and duties of director**

A. The director shall be directly responsible to the governor for the direction, control and operation of the department and shall:

1. Make such administrative rules as he deems necessary and proper to effectively administer the department and enforce this title and title 43.
2. On or before November 15 of each year issue a written report to the governor and legislature concerning the department's activities during the year. In any election year a copy of this report shall be made available to the governor-elect and to the legislature-elect.
3. On or before December 15 of each year issue a supplemental report which shall also contain proposed legislation recommended by the department for the improvement of the system of taxation in the state.
4. In addition to the report required by paragraph 2 of this subsection, on or before November 15 of each year issue a written report to the governor and legislature detailing the approximate costs in lost revenue for all state tax expenditures in effect at the time of the report. For the purpose of this paragraph, "tax expenditure" means any tax provision in state law which exempts, in whole or in part, any persons, income, goods, services or property from the impact of established taxes including deductions, subtractions, exclusions, exemptions, allowances and credits.
5. Annually, on or before January 10, prepare and submit to the legislature a report containing a summary of all the revisions made to the internal revenue code during the preceding calendar year.
6. Provide such assistance to the governor and the legislature as they may require.
7. Delegate such administrative functions, duties or powers as he deems necessary to carry out the efficient operation of the department.

B. The director may enter into an agreement with the taxing authority of any state which imposes a tax on or measured by income to provide that compensation paid in that state to residents of this state is exempt in that state from liability for income tax, the requirement for filing a tax return and withholding tax from compensation. Compensation paid in this state to residents of that state is reciprocally exempt from the requirements of title 43.

**§ 42-2003. [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information**

A. Confidential information relating to:

1. A taxpayer may be disclosed to the taxpayer, its successor in interest or a designee of the taxpayer who is authorized in writing by the taxpayer. A principal corporate officer of a parent corporation may execute a written authorization for a controlled subsidiary. If a taxpayer elects to file an Arizona small business income tax return under section 43-302, a written authorization by the taxpayer to allow the department to disclose personal income tax information to a designee includes the corresponding Arizona small business income tax return.
2. A corporate taxpayer may be disclosed to any principal officer, any person designated by a principal officer or any person designated in a resolution by the corporate board of directors or other similar governing body. If a corporate officer signs a statement under penalty of perjury representing that the officer is a principal officer, the department may rely on the statement until the statement is shown to be false. For the purposes of this paragraph, "principal officer" includes a chief executive officer, president, secretary, treasurer, vice president of tax, chief financial officer, chief operating officer or chief tax officer or any other corporate officer who has the authority to bind the taxpayer on matters related to state taxes.
3. A partnership may be disclosed to any partner of the partnership. This exception does not include disclosure of confidential information of a particular partner unless otherwise authorized.
4. A limited liability company may be disclosed to any member of the company or, if the company is manager-managed, to any manager.
5. An estate may be disclosed to the personal representative of the estate and to any heir, next of kin or beneficiary under the will of the decedent if the department finds that the heir, next of kin or beneficiary has a material interest that will be affected by the confidential information.
6. A trust may be disclosed to the trustee or trustees, jointly or separately, and to the grantor or any beneficiary of the trust if the department finds that the grantor or beneficiary has a material interest that will be affected by the confidential information.
7. A government entity may be disclosed to the head of the entity or a member of the governing board of the entity, or any employee of the entity

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

who has been delegated the authorization in writing by the head of the entity or the governing board of the entity.

8. Any taxpayer may be disclosed if the taxpayer has waived any rights to confidentiality either in writing or on the record in any administrative or judicial proceeding.

9. The name and taxpayer identification numbers of persons issued direct payment permits may be publicly disclosed.

10. Any taxpayer may be disclosed during a meeting or telephone call if the taxpayer is present during the meeting or telephone call and authorizes the disclosure of confidential information.

B. Confidential information may be disclosed to:

1. Any employee of the department whose official duties involve tax administration.

2. The office of the attorney general solely for its use in preparation for, or in an investigation that may result in, any proceeding involving tax administration before the department or any other agency or board of this state, or before any grand jury or any state or federal court.

3. The department of liquor licenses and control for its use in determining whether a spirituous liquor licensee has paid all transaction privilege taxes and affiliated excise taxes incurred as a result of the sale of spirituous liquor, as defined in section 4-101, at the licensed establishment and imposed on the licensed establishments by this state and its political subdivisions.

4. Other state tax officials whose official duties require the disclosure for proper tax administration purposes if the information is sought in connection with an investigation or any other proceeding conducted by the official. Any disclosure is limited to information of a taxpayer who is being investigated or who is a party to a proceeding conducted by the official.

5. The following agencies, officials and organizations, if they grant substantially similar privileges to the department for the type of information being sought, pursuant to statute and a written agreement between the department and the foreign country, agency, state, Indian tribe or organization:

(a) The United States internal revenue service, alcohol and tobacco tax and trade bureau of the United States treasury, United States bureau of alcohol, tobacco, firearms and explosives of the United States department of justice, United States drug enforcement agency and federal bureau of investigation.

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

- (b) A state tax official of another state.
  - (c) An organization of states, federation of tax administrators or multistate tax commission that operates an information exchange for tax administration purposes.
  - (d) An agency, official or organization of a foreign country with responsibilities that are comparable to those listed in subdivision (a), (b) or (c) of this paragraph.
  - (e) An agency, official or organization of an Indian tribal government with responsibilities comparable to the responsibilities of the agencies, officials or organizations identified in subdivision (a), (b) or (c) of this paragraph.
6. The auditor general, in connection with any audit of the department subject to the restrictions in section 42-2002, subsection D.
7. Any person to the extent necessary for effective tax administration in connection with:
- (a) The processing, storage, transmission, destruction and reproduction of the information.
  - (b) The programming, maintenance, repair, testing and procurement of equipment for purposes of tax administration.
  - (c) The collection of the taxpayer's civil liability.
8. The office of administrative hearings relating to taxes administered by the department pursuant to section 42-1101, but the department shall not disclose any confidential information without the taxpayer's written consent:
- (a) Regarding income tax or withholding tax.
  - (b) On any tax issue relating to information associated with the reporting of income tax or withholding tax.
9. The United States treasury inspector general for tax administration for the purpose of reporting a violation of internal revenue code section 7213A (26 United States Code section 7213A), unauthorized inspection of returns or return information.
10. The financial management service of the United States treasury department for use in the treasury offset program.



**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

11. The United States treasury department or its authorized agent for use in the state income tax levy program and in the electronic federal tax payment system.
12. The Arizona commerce authority for its use in:
  - (a) Qualifying renewable energy operations for the tax incentives under section 42-12006.
  - (b) Qualifying businesses with a qualified facility for income tax credits under sections 43-1083.03 and 43-1164.04.
  - (c) Fulfilling its annual reporting responsibility pursuant to section 41-1512, subsections U and V and section 41-1517, subsection L.
  - (d) Certifying computer data centers for tax relief under section 41-1519.
  - (e) Certifying applicants for the tax credit for motion picture production costs under sections 43-1082 and 43-1165.
13. A prosecutor for purposes of section 32-1164, subsection C.
14. The office of the state fire marshal for use in determining compliance with and enforcing title 37, chapter 9, article 5.
15. The department of transportation for its use in administering taxes, surcharges and penalties prescribed by title 28.
16. The Arizona health care cost containment system administration for its use in administering nursing facility provider assessments.
17. The department of administration risk management division and the office of the attorney general if the information relates to a claim against this state pursuant to section 12-821.01 involving the department of revenue.
18. Another state agency if the taxpayer authorizes the disclosure of confidential information in writing, including an authorization that is part of an application form or other document submitted to the agency.
19. The department of economic security for its use in determining whether an employer has paid all amounts due under the unemployment insurance program pursuant to title 23, chapter 4.
20. The department of health services for its use in determining the following:

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

(a) Whether a medical marijuana dispensary is in compliance with the tax requirements of chapter 5 of this title for the purposes of section 36-2806, subsection A.

(b) Whether a marijuana establishment, marijuana testing facility or dual licensee licensed under title 36, chapter 28.2 is in compliance with the tax obligations under this title or title 43.

21. The Arizona department of agriculture for the purpose of ascertaining compliance with the licensing provisions in title 3.

22. The office of economic opportunity for the purpose of performing the duties and obligations to or on behalf of this state prescribed by title 41, chapter 53.

C. Confidential information may be disclosed in any state or federal judicial or administrative proceeding pertaining to tax administration pursuant to the following conditions:

1. One or more of the following circumstances must apply:

(a) The taxpayer is a party to the proceeding.

(b) The proceeding arose out of, or in connection with, determining the taxpayer's civil or criminal liability, or the collection of the taxpayer's civil liability, with respect to any tax imposed under this title or title 43.

(c) The treatment of an item reflected on the taxpayer's return is directly related to the resolution of an issue in the proceeding.

(d) Return information directly relates to a transactional relationship between a person who is a party to the proceeding and the taxpayer and directly affects the resolution of an issue in the proceeding.

2. Confidential information may not be disclosed under this subsection if the disclosure is prohibited by section 42-2002, subsection C or D.

D. Identity information may be disclosed for purposes of notifying persons entitled to tax refunds if the department is unable to locate the persons after reasonable effort.

E. The department, on the request of any person, shall provide the names and addresses of bingo licensees as defined in section 5-401, verify whether or not a person has a privilege license and number, a tobacco product distributor's license and number or a withholding license and number or disclose the information to be posted on the department's website or

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

otherwise publicly accessible pursuant to section 42-1124, subsection F and section 42-3401.

F. A department employee, in connection with the official duties relating to any audit, collection activity or civil or criminal investigation, may disclose return information to the extent that disclosure is necessary to obtain information that is not otherwise reasonably available. These official duties include the correct determination of and liability for tax, the amount to be collected or the enforcement of other state tax revenue laws.

G. Confidential information relating to transaction privilege tax, use tax, severance tax, jet fuel excise and use tax and any other tax collected by the department on behalf of any jurisdiction may be disclosed to any county, city or town tax official if the information relates to a taxpayer who is or may be taxable by a county, city or town or who may be subject to audit by the department pursuant to section 42-6002. Any taxpayer information that is released by the department to the county, city or town:

1. May be used only for internal purposes, including audits. If there is a legitimate business need relating to enforcing laws, regulations and ordinances pursuant to section 9-500.39 or 11-269.17, a county, city or town tax official may redisclose transaction privilege tax information relating to a vacation rental or short-term rental property owner or online lodging operator from the new license report and license update report, subject to the following:

(a) The information redisclosed is limited to the following:

(i) The transaction privilege tax license number.

(ii) The type of organization or ownership of the business.

(iii) The legal business name and doing business as name, if different from the legal name.

(iv) The business mailing address, tax record physical location address, telephone number, email address and fax number.

(v) The date the business started in this state, the business description and the North American industry classification system code.

(vi) The name, address and telephone number for each owner, partner, corporate officer, member, managing member or official of the employing unit.

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

(b) Redisclosure is limited to nonelected officials in other units within the county, city or town. The information may not be redisclosed to an elected official or the elected official's staff.

(c) All redisclosures of confidential information made pursuant to this paragraph are subject to paragraph 2 of this subsection.

2. May not be disclosed to the public in any manner that does not comply with confidentiality standards established by the department. The county, city or town shall agree in writing with the department that any release of confidential information that violates the confidentiality standards adopted by the department will result in the immediate suspension of any rights of the county, city or town to receive taxpayer information under this subsection.

H. The department may disclose statistical information gathered from confidential information if it does not disclose confidential information attributable to any one taxpayer. The department may disclose statistical information gathered from confidential information, even if it discloses confidential information attributable to a taxpayer, to:

1. The state treasurer in order to comply with the requirements of section 42-5029, subsection A, paragraph 3.

2. The joint legislative income tax credit review committee, the joint legislative budget committee staff and the legislative staff in order to comply with the requirements of section 43-221.

I. The department may disclose the aggregate amounts of any tax credit, tax deduction or tax exemption enacted after January 1, 1994. Information subject to disclosure under this subsection shall not be disclosed if a taxpayer demonstrates to the department that such information would give an unfair advantage to competitors.

J. Except as provided in section 42-2002, subsection C, confidential information, described in section 42-2001, paragraph 1, subdivision (a), item (ii), may be disclosed to law enforcement agencies for law enforcement purposes.

K. The department may provide transaction privilege tax license information to property tax officials in a county for the purpose of identification and verification of the tax status of commercial property.

L. The department may provide transaction privilege tax, luxury tax, use tax, property tax and severance tax information to the ombudsman-citizens aide pursuant to title 41, chapter 8, article 5.

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

M. Except as provided in section 42-2002, subsection D, a court may order the department to disclose confidential information pertaining to a party to an action. An order shall be made only on a showing of good cause and that the party seeking the information has made demand on the taxpayer for the information.

N. This section does not prohibit the disclosure by the department of any information or documents submitted to the department by a bingo licensee. Before disclosing the information, the department shall obtain the name and address of the person requesting the information.

O. If the department is required or allowed to disclose confidential information, it may charge the person or agency requesting the information for the reasonable cost of its services.

P. Except as provided in section 42-2002, subsection D, the department of revenue shall release confidential information as requested by the department of economic security pursuant to section 42-1122 or 46-291. Information disclosed under this subsection is limited to the same type of information that the United States internal revenue service is authorized to disclose under section 6103(l)(6) of the internal revenue code.

Q. Except as provided in section 42-2002, subsection D, the department shall release confidential information as requested by the courts and clerks of the court pursuant to section 42-1122.

R. To comply with the requirements of section 42-5031, the department may disclose to the state treasurer, to the county stadium district board of directors and to any city or town tax official that is part of the county stadium district confidential information attributable to a taxpayer's business activity conducted in the county stadium district.

S. The department shall release to the attorney general confidential information as requested by the attorney general for purposes of determining compliance with or enforcing any of the following:

1. Any public health control law relating to tobacco sales as provided under title 36, chapter 6, article 14.
2. Any law relating to reduced cigarette ignition propensity standards as provided under title 37, chapter 9, article 5.
3. Sections 44-7101 and 44-7111, the master settlement agreement referred to in those sections and all agreements regarding disputes under the master settlement agreement.

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

T. For proceedings before the department, the office of administrative hearings, the state board of tax appeals or any state or federal court involving penalties that were assessed against a return preparer, an electronic return preparer or a payroll service company pursuant to section 42-1103.02, 42-1125.01 or 43-419, confidential information may be disclosed only before the judge or administrative law judge adjudicating the proceeding, the parties to the proceeding and the parties' representatives in the proceeding prior to its introduction into evidence in the proceeding. The confidential information may be introduced as evidence in the proceeding only if the taxpayer's name, the names of any dependents listed on the return, all social security numbers, the taxpayer's address, the taxpayer's signature and any attachments containing any of the foregoing information are redacted and if either:

1. The treatment of an item reflected on such a return is or may be related to the resolution of an issue in the proceeding.
2. Such a return or the return information relates or may relate to a transactional relationship between a person who is a party to the proceeding and the taxpayer that directly affects the resolution of an issue in the proceeding.
3. The method of payment of the taxpayer's withholding tax liability or the method of filing the taxpayer's withholding tax return is an issue for the period.

U. The department and attorney general may share the information specified in subsection S of this section with any of the following:

1. Federal, state or local agencies located in this state for the purposes of enforcement of the statutes or agreements specified in subsection S of this section or for the purposes of enforcement of corresponding laws of other states.
2. Indian tribes located in this state for the purposes of enforcement of the statutes or agreements specified in subsection S of this section.
3. A court, arbitrator, data clearinghouse or similar entity for the purpose of assessing compliance with or making calculations required by the master settlement agreement or agreements regarding disputes under the master settlement agreement, and with counsel for the parties or expert witnesses in any such proceeding, if the information otherwise remains confidential.

V. The department may provide the name and address of qualifying hospitals and qualifying health care organizations, as defined in section 42-

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

5001, to a business that is classified and reporting transaction privilege tax under the utilities classification.

W. The department may disclose to an official of any city, town or county in a current agreement or considering a prospective agreement with the department as described in section 42-5032.02, subsection G any information relating to amounts that are subject to distribution and that are required by section 42-5032.02. Information disclosed by the department under this subsection:

1. May be used only by the city, town or county for internal purposes.
2. May not be disclosed to the public in any manner that does not comply with confidentiality standards established by the department. The city, town or county must agree with the department in writing that any release of confidential information that violates the confidentiality standards will result in the immediate suspension of any rights of the city, town or county to receive information under this subsection.

X. Notwithstanding any other provision of this section, the department may not disclose information provided by an online lodging marketplace, as defined in section 42-5076, without the written consent of the online lodging marketplace, and the information may be disclosed only pursuant to subsection A, paragraphs 1 through 6, 8 and 10, subsection B, paragraphs 1, 2, 7 and 8 and subsections C, D and G of this section. Such information:

1. Is not subject to disclosure pursuant to title 39, relating to public records.
2. May not be disclosed to any agency of this state or of any county, city, town or other political subdivision of this state.

**History:**

Amended by L. 2023, ch. 11,s. 1, eff. ninety-one days after adjournment.  
Amended by L. 2022, ch. 387,s. 4, eff. 9/23/2022. Amended by L. 2022, ch. 235,s. 2, eff. 9/23/2022. Amended by L. 2021, ch. 196,s. 5, eff. 9/29/2021.  
Amended by L. 2019, ch. 240,s. 5, eff. 8/27/2019. Amended by L. 2019, ch. 142,s. 2, eff. 4/29/2019. Amended by L. 2018, ch. 338,s. 26, eff. December 31, 2018 only if Laws 2017, chapter 139, the subject of referendum petition R-02-2018, is approved. Amended by L. 2018, ch. 218,s. 4, eff. if Laws 2017, chapter 139, the subject of referendum petition R-02-2018, is approved by a vote of the people at the next general election or fails to be referred to the voters at the next general election. Amended by L. 2018, ch. 104,s. 8, eff. 8/3/2018. Amended by L. 2017, ch. 340,s. 2, eff. 12/31/2017. Amended by L. 2017, ch. 258,s. 43, eff. 8/9/2017. Amended by L. 2017, ch. 139,s. 4, eff.

**ARS 42-2003 [Effective ninety-one days after adjournment]  
Authorized disclosure of confidential information (Arizona  
Revised Statutes (2023 Edition))**

---

8/9/2017. Amended by L. 2017, ch. 96,s. 1, eff. 8/9/2017. Amended by L. 2016, ch. 128,s. 117, eff. 6/30/2016. Amended by L. 2016, ch. 208,s. 4, eff. 1/1/2017. Amended by L. 2015, ch. 199,s. 1, eff. 7/2/2015. Amended by L. 2015, ch. 114,s. 6, eff. 9/13/2013. Amended by L. 2015, ch. 85,s. 8, eff. 7/2/2015. Amended by L. 2014, ch. 263,s. 4, eff. 7/24/2014. Amended by L. 2014, ch. 211,s. 13, eff. 1/1/2015. Amended by L. 2014, ch. 160,s. 4, eff. 12/31/2014. Amended by L. 2013, ch. 255,s. 2, eff. 12/31/2014. Amended by L. 2013, ch. 222,s. 3, eff. 9/13/2013. Amended by L. 2013SP1, ch. 9,s. 3, eff. 9/12/2013. Amended by L. 2013, ch. 40,s. 2, eff. 9/13/2013.

**SSOT:**

This section is set out more than once due to postponed, multiple, or conflicting amendments.



**§ 42-3003. Powers of administration and regulation**

A. This chapter shall be administered by the department of revenue according to chapter 1, articles 1 and 3 of this title and this chapter.

B. In the administration of this chapter the department, its agents and representatives shall possess:

1. The powers, duties and authority of police officers within this state.
2. The powers and authority of appraisal, valuation, assessment, correction, computation, estimation, supervision, direction, investigation, inspection, collection and enforcement that are vested in the department by any law of this state relating to public revenue and taxation and applicable to the administration of this chapter.

**§ 42-3004. Rules**

The department may:

1. Adopt rules, not in conflict with this chapter, necessary for the enforcement of this chapter, including rules relating to refunds of taxes paid under this chapter.
2. Adopt different detailed rules applicable to diverse methods and conditions of sale or use of the luxuries upon which a tax is imposed by this chapter.
3. Prescribe in each luxury classification:
  - (a) Upon whom, as between the distributor, the wholesaler and the retailer or between the owner, lessor or other person in possession of any luxury, except for cigarettes, the primary duty of affixing official stamps or official labels rests.
  - (b) The manner in which the stamps or labels shall be affixed.

**§ 42-3051. Levy of tax**

In addition to all other taxes there is levied and imposed and there shall be collected and deposited, pursuant to sections 35-146 and 35-147, in the manner provided by this chapter, taxes on all spirituous, vinous and malt liquors and on all cigarettes, cigars, smoking tobacco, plug tobacco, snuff and other forms of tobacco, for use as may be prescribed by law.

**§ 42-3052. Classifications of luxuries; rates of tax**

The taxes under this chapter are imposed at the following rates:

1. On each sealed container of spirituous liquor at the rate of three dollars per gallon and at a proportionate rate for any lesser or greater quantity than one gallon.
2. On each container of vinous liquor, except cider, of which the alcoholic content is not greater than twenty-four per cent by volume at the rate of eighty-four cents per gallon and at a proportionate rate for any lesser or greater quantity than one gallon.
3. On each container of vinous liquor of which the alcoholic content is greater than twenty-four per cent by volume, containing eight ounces or less, twenty-five cents, and for each eight ounces for containers containing more than eight ounces, twenty-five cents.
4. On each gallon of malt liquor or cider, sixteen cents, and at a proportionate rate for any lesser or greater quantity than one gallon.
5. On each cigarette, nine-tenths cent.
6. On smoking tobacco, snuff, fine cut chewing tobacco, cut and granulated tobacco, shorts and refuse of fine cut chewing tobacco, and refuse, scraps, clippings, cuttings and sweepings of tobacco, excluding tobacco powder or tobacco products used exclusively for agricultural or horticultural purposes and unfit for human consumption, two cents per ounce or major fraction of an ounce.
7. On all cavendish, plug or twist tobacco, one-half cent per ounce or fractional part of an ounce.
8. On each twenty small cigars or fractional part weighing not more than three pounds per thousand, four cents.
9. On cigars of all descriptions except those included in paragraph 8 of this section, made of tobacco or any tobacco substitute:
  - (a) If manufactured to retail at not more than five cents each, two cents on each three cigars.
  - (b) If manufactured to retail at more than five cents each, two cents on each cigar.

**§ 42-3353. Return and payment by cider or malt liquor  
wholesalers**

A. Every wholesaler of cider or malt liquors purchasing cider or malt liquors for resale within the state shall pay the tax under this chapter on all such liquors so purchased and add the amount of the tax to the sales price.

B. The wholesaler shall pay the tax to the department monthly on or before the twentieth day of the month next succeeding the month in which the tax accrues.

C. On or before the date prescribed by subsection B of this section, the wholesaler shall prepare a sworn return for the month in which the tax accrues in the form prescribed by the department, showing:

1. The amount of cider or malt liquors purchased during the month in which the tax accrues.
2. The amount of tax for the period covered by the return.
3. Any other information that the department deems necessary for the proper administration of this chapter.

D. The taxpayer shall deliver the return, together with a remittance of the amount of the tax due, to the department.

E. Any taxpayer that fails to pay the tax within ten days from the date on which the payment becomes due is subject to and shall pay a penalty determined under section 42-1125, plus interest at the rate determined pursuant to section 42-1123 from the time the tax was due and payable until paid.

F. For reporting periods beginning from and after December 31, 2019, or when the department has established an electronic filing program, whichever is later, a taxpayer shall file electronically any report or return required under this chapter. The report or return is considered to be filed and received by the department on the date of the electronic postmark pursuant to section 42-1105.02.

**History:**

Amended by L. 2017, ch. 60, s. 10, eff. 8/9/2017. Amended by L. 2014, ch. 110, s. 2, eff. 7/24/2014.

**ARS 42-3355 Return and payment by farm wineries,  
manufacturers, direct shipment licensees, microbreweries and  
craft distillers (Arizona Revised Statutes (2023 Edition))**

---

**§ 42-3355. Return and payment by farm wineries, manufacturers, direct shipment licensees, microbreweries and craft distillers**

A. Every farm winery selling vinous liquor at retail or to a retail licensee pursuant to title 4, chapter 2 manufactured or produced on the premises, producer of vinous liquor that sells at retail pursuant to section 4-243.02 or direct shipment licensee that sells pursuant to section 4-203.04 shall pay the tax under this chapter on all such liquor sold at retail or to a retail licensee within this state and add the amount of the tax to the sales price.

B. Every microbrewery selling malt liquor at retail or to a retail licensee pursuant to title 4, chapter 2 manufactured or produced on the premises or a manufacturer of beer that sells at retail pursuant to section 4-243.02 shall pay the tax under this chapter on all malt liquor sold at retail or to a retail licensee within this state and add the amount of the tax to the sales price.

C. Every craft distiller selling spirituous liquor at retail or to a retail licensee pursuant to title 4, chapter 2, manufactured or produced on the premises or a distiller of spirituous liquor that sells at retail pursuant to section 4-243.02 shall pay the tax under this chapter on all spirituous liquor sold at retail or to a retail licensee within this state and add the amount of the tax to the sales price.

D. The farm winery, manufacturer, microbrewery, craft distiller or direct shipment licensee shall pay the tax to the department monthly on or before the twentieth day of the month next succeeding the month in which the tax accrues.

E. On or before that date, the farm winery, manufacturer, microbrewery, craft distiller or direct shipment licensee shall prepare a sworn return for the month in which the tax accrues in the form prescribed by the department, showing:

1. The amount of liquors or beer sold in this state during the month in which the tax accrues.
2. The amount of tax for the period covered by the return.
3. Any other information that the department deems necessary for the proper administration of this chapter.

F. The farm winery, manufacturer, microbrewery, craft distiller or direct shipment licensee shall deliver the return, together with a remittance of the amount of the tax due, to the department.

**ARS 42-3355 Return and payment by farm wineries,  
manufacturers, direct shipment licensees, microbreweries and  
craft distillers (Arizona Revised Statutes (2023 Edition))**

---

G. Any taxpayer that fails to pay the tax within ten days after the date on which the payment becomes due is subject to and shall pay a penalty determined under section 42-1125, plus interest at the rate determined pursuant to section 42-1123 from the time the tax was due and payable until paid.

H. For reporting periods beginning from and after December 31, 2019, or when the department has established an electronic filing program, whichever is later, each taxpayer shall file electronically any report or return required under this chapter. The report or return is considered to be filed and received by the department on the date of the electronic postmark pursuant to section 42-1105.02.

**History:**

Amended by L. 2017, ch. 60,s. 12, eff. 8/9/2017. Amended by L. 2016, ch. 76,s. 3, eff. 8/5/2016. Amended by L. 2014, ch. 253,s. 35, eff. 7/24/2014.

**§ 4-243.01. Purchasing from other than primary source of supply unlawful; definitions**

A. It is unlawful:

1. For any supplier to solicit, accept or fill any order for any spirituous liquor from any wholesaler in this state unless the supplier is the primary source of supply for the brand of spirituous liquor sold or sought to be sold and is duly licensed by the board.

2. For any wholesaler or any other licensee in this state to order, purchase or receive any spirituous liquor from any supplier unless the supplier is the primary source of supply for the brand ordered, purchased or received.

3. Except as provided by section 4-243.02 for a retailer to order, purchase or receive any spirituous liquor from any source other than any of the following:

(a) A wholesaler that has purchased the brand from the primary source of supply.

(b) A wholesaler that is the designated representative of the primary source of supply in this state and that has purchased such spirituous liquor from the designated representative of the primary source of supply within or without this state.

(c) A registered retail agent as defined in section 4-101.

(d) A farm winery that is licensed under section 4-205.04 and that is subject to the limits prescribed in section 4-205.04, subsection C, paragraph 7.

(e) A licensed microbrewery licensed under section 4-205.08.

(f) A craft distiller that is licensed under section 4-205.10 and that is subject to the limits prescribed in section 4-205.10, subsection C, paragraph 5.

B. All spirituous liquor shipped into this state shall be invoiced to the wholesaler by the primary source of supply. All spirituous liquor shall be unloaded and remain at the wholesaler's premises for at least twenty-four hours. A copy of each invoice shall be transmitted by the wholesaler and the primary source of supply to the department of revenue.

C. The director may suspend for a period of one year the license of any wholesaler or retailer who violates this section.



**ARS 4-243.01 Purchasing from other than primary source of supply unlawful; definitions (Arizona Revised Statutes (2023 Edition))**

---

D. On determination by the department of revenue that a primary source of supply has violated this section, a wholesaler may not accept any shipment of spirituous liquor from such primary source of supply for a period of one year.

E. For the purposes of this section:

1. "Primary source of supply" means the distiller, producer, owner of the commodity at the time it becomes a marketable product, bottler or exclusive agent of any such distributor or owner. In the case of imported products, the primary source of supply means either the foreign producer, owner, bottler or agent or the prime importer from, or the exclusive agent in, the United States of the foreign distiller, producer, bottler or owner.

2. "Wholesaler" means any person, firm or corporation that is licensed in this state to sell to retailers and that is engaged in the business of warehousing and distributing brands of various suppliers to retailers generally in the marketing area in which the wholesaler is located.

**History:**

Amended by L. 2021, ch. 94, s. 7, eff. 9/29/2021. Amended by L. 2014, ch. 253, s. 29, eff. 7/24/2014.

**§ 42-5023. Presumption as to tax base**

For the purpose of proper administration of this article and to prevent evasion of the tax imposed by this article it is presumed that all gross proceeds of sales and gross income derived by a person from business activity classified under a taxable business classification comprise the tax base for the business until the contrary is established.

**§ 42-5061. Retail classification; definitions**

A. The retail classification is comprised of the business of selling tangible personal property at retail. The tax base for the retail classification is the gross proceeds of sales or gross income derived from the business. The tax imposed on the retail classification does not apply to the gross proceeds of sales or gross income from:

1. Professional or personal service occupations or businesses that involve sales or transfers of tangible personal property only as inconsequential elements.
2. Services rendered in addition to selling tangible personal property at retail.
3. Sales of warranty or service contracts. The storage, use or consumption of tangible personal property provided under the conditions of such contracts is subject to tax under section 42-5156.
4. Sales of tangible personal property by any nonprofit organization organized and operated exclusively for charitable purposes and recognized by the United States internal revenue service under section 501(c)(3) of the internal revenue code.
5. Sales to persons engaged in business classified under the restaurant classification of articles used by human beings for food, drink or condiment, whether simple, mixed or compounded.
6. Business activity that is properly included in any other business classification that is taxable under this article.
7. The sale of stocks and bonds.
8. Drugs and medical oxygen, including delivery hose, mask or tent, regulator and tank, if prescribed by a member of the medical, dental or veterinarian profession who is licensed by law to administer such substances.
9. Prosthetic appliances as defined in section 23-501 and as prescribed or recommended by a health professional who is licensed pursuant to title 32, chapter 7, 8, 11, 13, 14, 15, 16, 17 or 29.
10. Insulin, insulin syringes and glucose test strips.
11. Prescription eyeglasses or contact lenses.

12. Hearing aids as defined in section 36-1901.
13. Durable medical equipment that has a centers for medicare and medicaid services common procedure code, is designated reimbursable by medicare, is prescribed by a person who is licensed under title 32, chapter 7, 8, 13, 14, 15, 17 or 29, can withstand repeated use, is primarily and customarily used to serve a medical purpose, is generally not useful to a person in the absence of illness or injury and is appropriate for use in the home.
14. Sales of motor vehicles to nonresidents of this state for use outside this state if either of the following apply:
  - (a) The motor vehicle dealer ships or delivers the motor vehicle to a destination out of this state.
  - (b) The vehicle, trailer or semitrailer has a gross vehicle weight rating of more than ten thousand pounds, is used or maintained to transport property in the furtherance of interstate commerce and otherwise meets the definition of commercial motor vehicle as defined in section 28-5201.
15. Food, as provided in and subject to the conditions of article 3 of this chapter and sections 42-5074 and 42-6017.
16. Items purchased with United States department of agriculture coupons issued under the supplemental nutrition assistance program pursuant to the food and nutrition act of 2008 (P.L. 88-525; 78 Stat. 703; 7 United States Code sections 2011 through 2036b) by the United States department of agriculture food and nutrition service or food instruments issued under section 17 of the child nutrition act (P.L. 95-627; 92 Stat. 3603; P.L. 99-661, section 4302; P.L. 111-296; 42 United States Code section 1786).
17. Textbooks by any bookstore that are required by any state university or community college.
18. Food and drink to a person that is engaged in a business that is classified under the restaurant classification and that provides such food and drink without monetary charge to its employees for their own consumption on the premises during the employees' hours of employment.
19. Articles of food, drink or condiment and accessory tangible personal property to a school district or charter school if such articles and accessory tangible personal property are to be prepared and served to persons for consumption on the premises of a public school within the district or on the premises of the charter school during school hours.
20. Lottery tickets or shares pursuant to title 5, chapter 5.1, article 1.

21. The sale of cash equivalents and the sale of precious metal bullion and monetized bullion to the ultimate consumer, but the sale of coins or other forms of money for manufacture into jewelry or works of art is subject to the tax and the gross proceeds of sales or gross income derived from the redemption of any cash equivalent by the holder as a means of payment for goods or services that are taxable under this article is subject to the tax. For the purposes of this paragraph:

(a) "Cash equivalents" means items or intangibles, whether or not negotiable, that are sold to one or more persons, through which a value denominated in money is purchased in advance and may be redeemed in full or in part for tangible personal property, intangibles or services. Cash equivalents include gift cards, stored value cards, gift certificates, vouchers, traveler's checks, money orders or other instruments, orders or electronic mechanisms, such as an electronic code, personal identification number or digital payment mechanism, or any other prepaid intangible right to acquire tangible personal property, intangibles or services in the future, whether from the seller of the cash equivalent or from another person. Cash equivalents do not include either of the following:

(i) Items or intangibles that are sold to one or more persons, through which a value is not denominated in money.

(ii) Prepaid calling cards or prepaid authorization numbers for telecommunications services made taxable by subsection P of this section.

(b) "Monetized bullion" means coins and other forms of money that are manufactured from gold, silver or other metals and that have been or are used as a medium of exchange in this or another state, the United States or a foreign nation.

(c) "Precious metal bullion" means precious metal, including gold, silver, platinum, rhodium and palladium, that has been smelted or refined so that its value depends on its contents and not on its form.

22. Motor vehicle fuel and use fuel that are subject to a tax imposed under title 28, chapter 16, article 1, sales of use fuel to a holder of a valid single trip use fuel tax permit issued under section 28-5739, sales of aviation fuel that are subject to the tax imposed under section 28-8344 and sales of jet fuel that are subject to the tax imposed under article 8 of this chapter.

23. Tangible personal property sold to a person engaged in the business of leasing or renting such property under the personal property rental classification if such property is to be leased or rented by such person.

24. Tangible personal property sold in interstate or foreign commerce if prohibited from being so taxed by the constitution of the United States or the constitution of this state.

25. Tangible personal property sold to:

(a) A qualifying hospital as defined in section 42-5001.

(b) A qualifying health care organization as defined in section 42-5001 if the tangible personal property is used by the organization solely to provide health and medical related educational and charitable services.

(c) A qualifying health care organization as defined in section 42-5001 if the organization is dedicated to providing educational, therapeutic, rehabilitative and family medical education training for blind and visually impaired children and children with multiple disabilities from the time of birth to age twenty-one.

(d) A qualifying community health center as defined in section 42-5001.

(e) A nonprofit charitable organization that has qualified under section 501(c)(3) of the internal revenue code and that regularly serves meals to the needy and indigent on a continuing basis at no cost.

(f) For taxable periods beginning from and after June 30, 2001, a nonprofit charitable organization that has qualified under section 501(c)(3) of the internal revenue code and that provides residential apartment housing for low-income persons over sixty-two years of age in a facility that qualifies for a federal housing subsidy, if the tangible personal property is used by the organization solely to provide residential apartment housing for low-income persons over sixty-two years of age in a facility that qualifies for a federal housing subsidy.

(g) A qualifying health sciences educational institution as defined in section 42-5001.

(h) Any person representing or working on behalf of another person described in subdivisions (a) through (g) of this paragraph if the tangible personal property is incorporated or fabricated into a project described in section 42-5075, subsection O.

26. Magazines or other periodicals or other publications by this state to encourage tourist travel.

27. Tangible personal property sold to:

(a) A person that is subject to tax under this article by reason of being engaged in business classified under section 42-5075 or to a subcontractor working under the control of a person engaged in business classified under section 42-5075, if the property so sold is any of the following:

(i) Incorporated or fabricated by the person into any real property, structure, project, development or improvement as part of the business.

(ii) Incorporated or fabricated by the person into any project described in section 42-5075, subsection O.

(iii) Used in environmental response or remediation activities under section 42-5075, subsection B, paragraph 6.

(b) A person that is not subject to tax under section 42-5075 and that has been provided a copy of a certificate under section 42-5009, subsection L, if the property so sold is incorporated or fabricated by the person into the real property, structure, project, development or improvement described in the certificate.

28. The sale of a motor vehicle to a nonresident of this state if the purchaser's state of residence does not allow a corresponding use tax exemption to the tax imposed by article 1 of this chapter and if the nonresident has secured a special ninety day nonresident registration permit for the vehicle as prescribed by sections 28-2154 and 28-2154.01.

29. Tangible personal property purchased in this state by a nonprofit charitable organization that has qualified under section 501(c)(3) of the United States internal revenue code and that engages in and uses such property exclusively in programs for persons with mental or physical disabilities if the programs are exclusively for training, job placement, rehabilitation or testing.

30. Sales of tangible personal property by a nonprofit organization that is exempt from taxation under section 501(c)(3), 501(c)(4) or 501(c)(6) of the internal revenue code if the organization is associated with a major league baseball team or a national touring professional golfing association and no part of the organization's net earnings inures to the benefit of any private shareholder or individual. This paragraph does not apply to an organization that is owned, managed or controlled, in whole or in part, by a major league baseball team, or its owners, officers, employees or agents, or by a major league baseball association or professional golfing association, or its owners, officers, employees or agents, unless the organization conducted or operated exhibition events in this state before January 1, 2018 that were exempt from taxation under section 42-5073.

31. Sales of commodities, as defined by title 7 United States Code section 2, that are consigned for resale in a warehouse in this state in or from which the commodity is deliverable on a contract for future delivery subject to the rules of a commodity market regulated by the United States commodity futures trading commission.

32. Sales of tangible personal property by a nonprofit organization that is exempt from taxation under section 501(c)(3), 501(c)(4), 501(c)(6), 501(c)(7) or 501(c)(8) of the internal revenue code if the organization sponsors or operates a rodeo featuring primarily farm and ranch animals and no part of the organization's net earnings inures to the benefit of any private shareholder or individual.

33. Sales of propagative materials to persons who use those items to commercially produce agricultural, horticultural, viticultural or floricultural crops in this state. For the purposes of this paragraph, "propagative materials":

(a) Includes seeds, seedlings, roots, bulbs, liners, transplants, cuttings, soil and plant additives, agricultural minerals, auxiliary soil and plant substances, micronutrients, fertilizers, insecticides, herbicides, fungicides, soil fumigants, desiccants, rodenticides, adjuvants, plant nutrients and plant growth regulators.

(b) Except for use in commercially producing industrial hemp as defined in section 3-311, does not include any propagative materials used in producing any part, including seeds, of any plant of the genus cannabis.

34. Machinery, equipment, technology or related supplies that are only useful to assist a person with a physical disability as defined in section 46-191 or a person who has a developmental disability as defined in section 36-551 or has a head injury as defined in section 41-3201 to be more independent and functional.

35. Sales of natural gas or liquefied petroleum gas used to propel a motor vehicle.

36. Paper machine clothing, such as forming fabrics and dryer felts, sold to a paper manufacturer and directly used or consumed in paper manufacturing.

37. Coal, petroleum, coke, natural gas, virgin fuel oil and electricity sold to a qualified environmental technology manufacturer, producer or processor as defined in section 41-1514.02 and directly used or consumed in generating or providing on-site power or energy solely for environmental technology manufacturing, producing or processing or environmental protection. This



paragraph applies for twenty full consecutive calendar or fiscal years from the date the first paper manufacturing machine is placed in service. In the case of an environmental technology manufacturer, producer or processor that does not manufacture paper, the time period begins with the date the first manufacturing, processing or production equipment is placed in service.

38. Sales of liquid, solid or gaseous chemicals used in manufacturing, processing, fabricating, mining, refining, metallurgical operations, research and development and, beginning on January 1, 1999, printing, if using or consuming the chemicals, alone or as part of an integrated system of chemicals, involves direct contact with the materials from which the product is produced for the purpose of causing or allowing a chemical or physical change to occur in the materials as part of the production process. This paragraph does not include chemicals that are used or consumed in activities such as packaging, storage or transportation but does not affect any deduction for such chemicals that is otherwise provided by this section. For the purposes of this paragraph, "printing" means a commercial printing operation and includes job printing, engraving, embossing, copying and bookbinding.

39. Through December 31, 1994, personal property liquidation transactions, conducted by a personal property liquidator. From and after December 31, 1994, personal property liquidation transactions shall be taxable under this section provided that nothing in this subsection shall be construed to authorize the taxation of casual activities or transactions under this chapter. For the purposes of this paragraph:

(a) "Personal property liquidation transaction" means a sale of personal property made by a personal property liquidator acting solely on behalf of the owner of the personal property sold at the dwelling of the owner or on the death of any owner, on behalf of the surviving spouse, if any, any devisee or heir or the personal representative of the estate of the deceased, if one has been appointed.

(b) "Personal property liquidator" means a person who is retained to conduct a sale in a personal property liquidation transaction.

40. Sales of food, drink and condiment for consumption within the premises of any prison, jail or other institution under the jurisdiction of the state department of corrections, the department of public safety, the department of juvenile corrections or a county sheriff.

41. A motor vehicle and any repair and replacement parts and tangible personal property becoming a part of such motor vehicle sold to a motor

carrier that is subject to a fee prescribed in title 28, chapter 16, article 4 and that is engaged in the business of leasing or renting such property.

42. Sales of:

(a) Livestock and poultry to persons engaging in the businesses of farming, ranching or producing livestock or poultry.

(b) Livestock and poultry feed, salts, vitamins and other additives for livestock or poultry consumption that are sold to persons for use or consumption by their own livestock or poultry, for use or consumption in the businesses of farming, ranching and producing or feeding livestock, poultry, or livestock or poultry products or for use or consumption in noncommercial boarding of livestock. For the purposes of this paragraph, "poultry" includes ratites.

43. Sales of implants used as growth promotants and injectable medicines, not already exempt under paragraph 8 of this subsection, for livestock or poultry owned by or in possession of persons that are engaged in producing livestock, poultry, or livestock or poultry products or that are engaged in feeding livestock or poultry commercially. For the purposes of this paragraph, "poultry" includes ratites.

44. Sales of motor vehicles at auction to nonresidents of this state for use outside this state if the vehicles are shipped or delivered out of this state, regardless of where title to the motor vehicles passes or its free on board point.

45. Tangible personal property sold to a person engaged in business and subject to tax under the transient lodging classification if the tangible personal property is a personal hygiene item or articles used by human beings for food, drink or condiment, except alcoholic beverages, that are furnished without additional charge to and intended to be consumed by the transient during the transient's occupancy.

46. Sales of alternative fuel, as defined in section 1-215, to a used oil fuel burner who has received a permit to burn used oil or used oil fuel under section 49-426 or 49-480.

47. Sales of materials that are purchased by or for publicly funded libraries, including school district libraries, charter school libraries, community college libraries, state university libraries or federal, state, county or municipal libraries, for use by the public as follows:

(a) Printed or photographic materials, beginning August 7, 1985.

(b) Electronic or digital media materials, beginning July 17, 1994.

48. Tangible personal property sold to a commercial airline and consisting of food, beverages and condiments and accessories used for serving the food and beverages, if those items are to be provided without additional charge to passengers for consumption in flight. For the purposes of this paragraph, "commercial airline" means a person holding a federal certificate of public convenience and necessity or foreign air carrier permit for air transportation to transport persons, property or United States mail in intrastate, interstate or foreign commerce.

49. Sales of alternative fuel vehicles if the vehicle was manufactured as a diesel fuel vehicle and converted to operate on alternative fuel and equipment that is installed in a conventional diesel fuel motor vehicle to convert the vehicle to operate on an alternative fuel, as defined in section 1-215.

50. Sales of any spirituous, vinous or malt liquor by a person that is licensed in this state as a wholesaler by the department of liquor licenses and control pursuant to title 4, chapter 2, article 1.

51. Sales of tangible personal property to be incorporated or installed as part of environmental response or remediation activities under section 42-5075, subsection B, paragraph 6.

52. Sales of tangible personal property by a nonprofit organization that is exempt from taxation under section 501(c)(6) of the internal revenue code if the organization produces, organizes or promotes cultural or civic related festivals or events and no part of the organization's net earnings inures to the benefit of any private shareholder or individual.

53. Application services that are designed to assess or test student learning or to promote curriculum design or enhancement purchased by or for any school district, charter school, community college or state university. For the purposes of this paragraph:

(a) "Application services" means software applications provided remotely using hypertext transfer protocol or another network protocol.

(b) "Curriculum design or enhancement" means planning, implementing or reporting on courses of study, lessons, assignments or other learning activities.

54. Sales of motor vehicle fuel and use fuel to a qualified business under section 41-1516 for off-road use in harvesting, processing or transporting

qualifying forest products removed from qualifying projects as defined in section 41-1516.

55. Sales of repair parts installed in equipment used directly by a qualified business under section 41-1516 in harvesting, processing or transporting qualifying forest products removed from qualifying projects as defined in section 41-1516.

56. Sales or other transfers of renewable energy credits or any other unit created to track energy derived from renewable energy resources. For the purposes of this paragraph, "renewable energy credit" means a unit created administratively by the corporation commission or governing body of a public power utility to track kilowatt hours of electricity derived from a renewable energy resource or the kilowatt hour equivalent of conventional energy resources displaced by distributed renewable energy resources.

57. Orthodontic devices dispensed by a dental professional who is licensed under title 32, chapter 11 to a patient as part of the practice of dentistry.

58. Sales of tangible personal property incorporated or fabricated into a project described in section 42-5075, subsection O, that is located within the exterior boundaries of an Indian reservation for which the owner, as defined in section 42-5075, of the project is an Indian tribe or an affiliated Indian. For the purposes of this paragraph:

(a) "Affiliated Indian" means an individual Native American Indian who is duly registered on the tribal rolls of the Indian tribe for whose benefit the Indian reservation was established.

(b) "Indian reservation" means all lands that are within the limits of areas set aside by the United States for the exclusive use and occupancy of an Indian tribe by treaty, law or executive order and that are recognized as Indian reservations by the United States department of the interior.

(c) "Indian tribe" means any organized nation, tribe, band or community that is recognized as an Indian tribe by the United States department of the interior and includes any entity formed under the laws of the Indian tribe.

59. Sales of works of fine art, as defined in section 44-1771, at an art auction or gallery in this state to nonresidents of this state for use outside this state if the vendor ships or delivers the work of fine art to a destination outside this state.

60. Sales of tangible personal property by a marketplace seller that are facilitated by a marketplace facilitator in which the marketplace facilitator

has remitted or will remit the applicable tax to the department pursuant to section 42-5014.

B. In addition to the deductions from the tax base prescribed by subsection A of this section, the gross proceeds of sales or gross income derived from sales of the following categories of tangible personal property shall be deducted from the tax base:

1. Machinery, or equipment, used directly in manufacturing, processing, fabricating, job printing, refining or metallurgical operations. The terms "manufacturing", "processing", "fabricating", "job printing", "refining" and "metallurgical" as used in this paragraph refer to and include those operations commonly understood within their ordinary meaning. "Metallurgical operations" includes leaching, milling, precipitating, smelting and refining.

2. Mining machinery, or equipment, used directly in the process of extracting ores or minerals from the earth for commercial purposes, including equipment required to prepare the materials for extraction and handling, loading or transporting such extracted material to the surface. "Mining" includes underground, surface and open pit operations for extracting ores and minerals.

3. Tangible personal property sold to persons engaged in business classified under the telecommunications classification, including a person representing or working on behalf of such a person in a manner described in section 42-5075, subsection O, and consisting of central office switching equipment, switchboards, private branch exchange equipment, microwave radio equipment and carrier equipment including optical fiber, coaxial cable and other transmission media that are components of carrier systems.

4. Machinery, equipment or transmission lines used directly in producing or transmitting electrical power, but not including distribution. Transformers and control equipment used at transmission substation sites constitute equipment used in producing or transmitting electrical power.

5. Machinery and equipment used directly for energy storage for later electrical use. For the purposes of this paragraph:

(a) "Electric utility scale" means a person that is engaged in a business activity described in section 42-5063, subsection A or such person's equipment or wholesale electricity suppliers.

(b) "Energy storage" means commercially available technology for electric utility scale that is capable of absorbing energy, storing energy for a period

of time and thereafter dispatching the energy and that uses mechanical, chemical or thermal processes to store energy.

(c) "Machinery and equipment used directly" means all machinery and equipment that are used for electric energy storage from the point of receipt of such energy in order to facilitate storage of the electric energy to the point where the electric energy is released.

6. Neat animals, horses, asses, sheep, raites, swine or goats used or to be used as breeding or production stock, including sales of breedings or ownership shares in such animals used for breeding or production.

7. Pipes or valves four inches in diameter or larger used to transport oil, natural gas, artificial gas, water or coal slurry, including compressor units, regulators, machinery and equipment, fittings, seals and any other part that is used in operating the pipes or valves.

8. Aircraft, navigational and communication instruments and other accessories and related equipment sold to:

(a) A person:

(i) Holding, or exempted by federal law from obtaining, a federal certificate of public convenience and necessity for use as, in conjunction with or becoming part of an aircraft to be used to transport persons for hire in intrastate, interstate or foreign commerce.

(ii) That is certificated or licensed under federal aviation administration regulations (14 Code of Federal Regulations part 121 or 135) as a scheduled or unscheduled carrier of persons for hire for use as or in conjunction with or becoming part of an aircraft to be used to transport persons for hire in intrastate, interstate or foreign commerce.

(iii) Holding a foreign air carrier permit for air transportation for use as or in conjunction with or becoming a part of aircraft to be used to transport persons, property or United States mail in intrastate, interstate or foreign commerce.

(iv) Operating an aircraft to transport persons in any manner for compensation or hire, or for use in a fractional ownership program that meets the requirements of federal aviation administration regulations (14 Code of Federal Regulations part 91, subpart K), including as an air carrier, a foreign air carrier or a commercial operator or under a restricted category, within the meaning of 14 Code of Federal Regulations, regardless of whether the operation or aircraft is regulated or certified under part 91, 119, 121, 133, 135, 136 or 137, or another part of 14 Code of Federal Regulations.

(v) That will lease or otherwise transfer operational control, within the meaning of federal aviation administration operations specification A008, or its successor, of the aircraft, instruments or accessories to one or more persons described in item (i), (ii), (iii) or (iv) of this subdivision, subject to section 42-5009, subsection Q.

(b) Any foreign government.

(c) Persons who are not residents of this state and who will not use such property in this state other than in removing such property from this state. This subdivision also applies to corporations that are not incorporated in this state, regardless of maintaining a place of business in this state, if the principal corporate office is located outside this state and the property will not be used in this state other than in removing the property from this state.

9. Machinery, tools, equipment and related supplies used or consumed directly in repairing, remodeling or maintaining aircraft, aircraft engines or aircraft component parts by or on behalf of a certificated or licensed carrier of persons or property.

10. Railroad rolling stock, rails, ties and signal control equipment used directly to transport persons or property.

11. Machinery or equipment used directly to drill for oil or gas or used directly in the process of extracting oil or gas from the earth for commercial purposes.

12. Buses or other urban mass transit vehicles that are used directly to transport persons or property for hire or pursuant to a governmentally adopted and controlled urban mass transportation program and that are sold to bus companies holding a federal certificate of convenience and necessity or operated by any city, town or other governmental entity or by any person contracting with such governmental entity as part of a governmentally adopted and controlled program to provide urban mass transportation.

13. Groundwater measuring devices required under section 45-604.

14. Machinery and equipment consisting of agricultural aircraft, tractors, off-highway vehicles, tractor-drawn implements, self-powered implements, machinery and equipment necessary for extracting milk, and machinery and equipment necessary for cooling milk and livestock, and drip irrigation lines not already exempt under paragraph 7 of this subsection and that are used for commercial production of agricultural, horticultural, viticultural and

floricultural crops and products in this state. For the purposes of this paragraph:

(a) "Off-highway vehicles" means off-highway vehicles as defined in section 28-1171 that are modified at the time of sale to function as a tractor or to tow tractor-drawn implements and that are not equipped with a modified exhaust system to increase horsepower or speed or an engine that is more than one thousand cubic centimeters or that have a maximum speed of fifty miles per hour or less.

(b) "Self-powered implements" includes machinery and equipment that are electric-powered.

15. Machinery or equipment used in research and development. For the purposes of this paragraph, "research and development" means basic and applied research in the sciences and engineering, and designing, developing or testing prototypes, processes or new products, including research and development of computer software that is embedded in or an integral part of the prototype or new product or that is required for machinery or equipment otherwise exempt under this section to function effectively. Research and development do not include manufacturing quality control, routine consumer product testing, market research, sales promotion, sales service, research in social sciences or psychology, computer software research that is not included in the definition of research and development, or other nontechnological activities or technical services.

16. Tangible personal property that is used by either of the following to receive, store, convert, produce, generate, decode, encode, control or transmit telecommunications information:

(a) Any direct broadcast satellite television or data transmission service that operates pursuant to 47 Code of Federal Regulations part 25.

(b) Any satellite television or data transmission facility, if both of the following conditions are met:

(i) Over two-thirds of the transmissions, measured in megabytes, transmitted by the facility during the test period were transmitted to or on behalf of one or more direct broadcast satellite television or data transmission services that operate pursuant to 47 Code of Federal Regulations part 25.

(ii) Over two-thirds of the transmissions, measured in megabytes, transmitted by or on behalf of those direct broadcast television or data transmission services during the test period were transmitted by the facility



to or on behalf of those services. For the purposes of subdivision (b) of this paragraph, "test period" means the three hundred sixty-five day period beginning on the later of the date on which the tangible personal property is purchased or the date on which the direct broadcast satellite television or data transmission service first transmits information to its customers.

17. Clean rooms that are used for manufacturing, processing, fabrication or research and development, as defined in paragraph 15 of this subsection, of semiconductor products. For the purposes of this paragraph, "clean room" means all property that comprises or creates an environment where humidity, temperature, particulate matter and contamination are precisely controlled within specified parameters, without regard to whether the property is actually contained within that environment or whether any of the property is affixed to or incorporated into real property. Clean room:

(a) Includes the integrated systems, fixtures, piping, movable partitions, lighting and all property that is necessary or adapted to reduce contamination or to control airflow, temperature, humidity, chemical purity or other environmental conditions or manufacturing tolerances, as well as the production machinery and equipment operating in conjunction with the clean room environment.

(b) Does not include the building or other permanent, nonremovable component of the building that houses the clean room environment.

18. Machinery and equipment used directly in feeding poultry, environmentally controlling housing for poultry, moving eggs within a production and packaging facility or sorting or cooling eggs. This exemption does not apply to vehicles used for transporting eggs.

19. Machinery or equipment, including related structural components and containment structures, that is employed in connection with manufacturing, processing, fabricating, job printing, refining, mining, natural gas pipelines, metallurgical operations, telecommunications, producing or transmitting electricity or research and development and that is used directly to meet or exceed rules or regulations adopted by the federal energy regulatory commission, the United States environmental protection agency, the United States nuclear regulatory commission, the Arizona department of environmental quality or a political subdivision of this state to prevent, monitor, control or reduce land, water or air pollution. For the purposes of this paragraph, "containment structure" means a structure that prevents, monitors, controls or reduces noxious or harmful discharge into the environment.

20. Machinery and equipment that are sold to a person engaged in commercially producing livestock, livestock products or agricultural, horticultural, viticultural or floricultural crops or products in this state, including a person representing or working on behalf of such a person in a manner described in section 42-5075, subsection O, if the machinery and equipment are used directly and primarily to prevent, monitor, control or reduce air, water or land pollution.

21. Machinery or equipment that enables a television station to originate and broadcast or to receive and broadcast digital television signals and that was purchased to facilitate compliance with the telecommunications act of 1996 (P.L. 104-104; 110 Stat. 56; 47 United States Code section 336) and the federal communications commission order issued April 21, 1997 (47 Code of Federal Regulations part 73). This paragraph does not exempt any of the following:

(a) Repair or replacement parts purchased for the machinery or equipment described in this paragraph.

(b) Machinery or equipment purchased to replace machinery or equipment for which an exemption was previously claimed and taken under this paragraph.

(c) Any machinery or equipment purchased after the television station has ceased analog broadcasting, or purchased after November 1, 2009, whichever occurs first.

22. Qualifying equipment that is purchased from and after June 30, 2004 through June 30, 2024 by a qualified business under section 41-1516 for harvesting or processing qualifying forest products removed from qualifying projects as defined in section 41-1516. To qualify for this deduction, the qualified business at the time of purchase must present its certification approved by the department.

23. Computer data center equipment sold to the owner, operator or qualified colocation tenant of a computer data center that is certified by the Arizona commerce authority under section 41-1519 or an authorized agent of the owner, operator or qualified colocation tenant during the qualification period for use in the qualified computer data center. For the purposes of this paragraph, "computer data center", "computer data center equipment", "qualification period" and "qualified colocation tenant" have the same meanings prescribed in section 41-1519.

C. The deductions provided by subsection B of this section do not include sales of:

1. Expendable materials. For the purposes of this paragraph, expendable materials do not include any of the categories of tangible personal property specified in subsection B of this section regardless of the cost or useful life of that property.
  2. Janitorial equipment and hand tools.
  3. Office equipment, furniture and supplies.
  4. Tangible personal property used in selling or distributing activities, other than the telecommunications transmissions described in subsection B, paragraph 16 of this section.
  5. Motor vehicles required to be licensed by this state, except buses or other urban mass transit vehicles specifically exempted pursuant to subsection B, paragraph 12 of this section, without regard to the use of such motor vehicles.
  6. Shops, buildings, docks, depots and all other materials of whatever kind or character not specifically included as exempt.
  7. Motors and pumps used in drip irrigation systems.
  8. Machinery and equipment or other tangible personal property used by a contractor in performing a contract.
- D. In addition to the deductions from the tax base prescribed by subsection A of this section, there shall be deducted from the tax base the gross proceeds of sales or gross income derived from sales of machinery, equipment, materials and other tangible personal property used directly and predominantly to construct a qualified environmental technology manufacturing, producing or processing facility as described in section 41-1514.02. This subsection applies for ten full consecutive calendar or fiscal years after the start of initial construction.
- E. In computing the tax base, gross proceeds of sales or gross income from retail sales of heavy trucks and trailers does not include any amount attributable to federal excise taxes imposed by 26 United States Code section 4051.
- F. If a person is engaged in an occupation or business to which subsection A of this section applies, the person's books shall be kept so as to show separately the gross proceeds of sales of tangible personal property and the gross income from sales of services, and if not so kept the tax shall be imposed on the total of the person's gross proceeds of sales of tangible personal property and gross income from services.

G. If a person is engaged in the business of selling tangible personal property at both wholesale and retail, the tax under this section applies only to the gross proceeds of the sales made other than at wholesale if the person's books are kept so as to show separately the gross proceeds of sales of each class, and if the books are not so kept, the tax under this section applies to the gross proceeds of every sale so made.

H. A person who engages in manufacturing, baling, crating, boxing, barreling, canning, bottling, sacking, preserving, processing or otherwise preparing for sale or commercial use any livestock, agricultural or horticultural product or any other product, article, substance or commodity and who sells the product of such business at retail in this state is deemed, as to such sales, to be engaged in business classified under the retail classification. This subsection does not apply to:

1. Agricultural producers who are owners, proprietors or tenants of agricultural lands, orchards, farms or gardens where agricultural products are grown, raised or prepared for market and who are marketing their own agricultural products.

2. Businesses classified under the:

(a) Transporting classification.

(b) Utilities classification.

(c) Telecommunications classification.

(d) Pipeline classification.

(e) Private car line classification.

(f) Publication classification.

(g) Job printing classification.

(h) Prime contracting classification.

(i) Restaurant classification.

I. The gross proceeds of sales or gross income derived from the following shall be deducted from the tax base for the retail classification:

1. Sales made directly to the United States government or its departments or agencies by a manufacturer, modifier, assembler or repairer.

2. Sales made directly to a manufacturer, modifier, assembler or repairer if such sales are of any ingredient or component part of products sold directly to the United States government or its departments or agencies by the manufacturer, modifier, assembler or repairer.

3. Overhead materials or other tangible personal property that is used in performing a contract between the United States government and a manufacturer, modifier, assembler or repairer, including property used in performing a subcontract with a government contractor who is a manufacturer, modifier, assembler or repairer, to which title passes to the government under the terms of the contract or subcontract.

4. Sales of overhead materials or other tangible personal property to a manufacturer, modifier, assembler or repairer if the gross proceeds of sales or gross income derived from the property by the manufacturer, modifier, assembler or repairer will be exempt under paragraph 3 of this subsection.

J. There shall be deducted from the tax base fifty percent of the gross proceeds or gross income from any sale of tangible personal property made directly to the United States government or its departments or agencies that is not deducted under subsection I of this section.

K. The department shall require every person claiming a deduction provided by subsection I or J of this section to file on forms prescribed by the department at such times as the department directs a sworn statement disclosing the name of the purchaser and the exact amount of sales on which the exclusion or deduction is claimed.

L. In computing the tax base, gross proceeds of sales or gross income does not include:

1. A manufacturer's cash rebate on the sales price of a motor vehicle if the buyer assigns the buyer's right in the rebate to the retailer.

2. The waste tire disposal fee imposed pursuant to section 44-1302.

M. There shall be deducted from the tax base the amount received from sales of solar energy devices. The retailer shall register with the department as a solar energy retailer. By registering, the retailer acknowledges that it will make its books and records relating to sales of solar energy devices available to the department for examination.

N. In computing the tax base in the case of the sale or transfer of wireless telecommunications equipment as an inducement to a customer to enter into or continue a contract for telecommunications services that are taxable under section 42-5064, gross proceeds of sales or gross income does not

include any sales commissions or other compensation received by the retailer as a result of the customer entering into or continuing a contract for the telecommunications services.

O. For the purposes of this section, a sale of wireless telecommunications equipment to a person who holds the equipment for sale or transfer to a customer as an inducement to enter into or continue a contract for telecommunications services that are taxable under section 42-5064 is considered to be a sale for resale in the regular course of business.

P. Retail sales of prepaid calling cards or prepaid authorization numbers for telecommunications services, including sales of reauthorization of a prepaid card or authorization number, are subject to tax under this section.

Q. For the purposes of this section, the diversion of gas from a pipeline by a person engaged in the business of:

1. Operating a natural or artificial gas pipeline, for the sole purpose of fueling compressor equipment to pressurize the pipeline, is not a sale of the gas to the operator of the pipeline.

2. Converting natural gas into liquefied natural gas, for the sole purpose of fueling compressor equipment used in the conversion process, is not a sale of gas to the operator of the compressor equipment.

R. For the purposes of this section, the transfer of title or possession of coal from an owner or operator of a power plant to a person in the business of refining coal is not a sale of coal if both of the following apply:

1. The transfer of title or possession of the coal is for the purpose of refining the coal.

2. The title or possession of the coal is transferred back to the owner or operator of the power plant after completion of the coal refining process. For the purposes of this paragraph, "coal refining process" means the application of a coal additive system that aids in the reduction of power plant emissions during the combustion of coal and the treatment of flue gas.

S. If a seller is entitled to a deduction pursuant to subsection B, paragraph 16, subdivision (b) of this section, the department may require the purchaser to establish that the requirements of subsection B, paragraph 16, subdivision (b) of this section have been satisfied. If the purchaser cannot establish that the requirements of subsection B, paragraph 16, subdivision (b) of this section have been satisfied, the purchaser is liable in an amount equal to any tax, penalty and interest that the seller would have been required to pay under article 1 of this chapter if the seller had not made a deduction

pursuant to subsection B, paragraph 16, subdivision (b) of this section. Payment of the amount under this subsection exempts the purchaser from liability for any tax imposed under article 4 of this chapter and related to the tangible personal property purchased. The amount shall be treated as transaction privilege tax to the purchaser and as tax revenues collected from the seller to designate the distribution base pursuant to section 42-5029.

T. For the purposes of section 42-5032.01, the department shall separately account for revenues collected under the retail classification from businesses selling tangible personal property at retail:

1. On the premises of a multipurpose facility that is owned, leased or operated by the tourism and sports authority pursuant to title 5, chapter 8.
2. At professional football contests that are held in a stadium located on the campus of an institution under the jurisdiction of the Arizona board of regents.

U. In computing the tax base for the sale of a motor vehicle to a nonresident of this state, if the purchaser's state of residence allows a corresponding use tax exemption to the tax imposed by article 1 of this chapter and the rate of the tax in the purchaser's state of residence is lower than the rate prescribed in article 1 of this chapter or if the purchaser's state of residence does not impose an excise tax, and the nonresident has secured a special ninety day nonresident registration permit for the vehicle as prescribed by sections 28-2154 and 28-2154.01, there shall be deducted from the tax base a portion of the gross proceeds or gross income from the sale so that the amount of transaction privilege tax that is paid in this state is equal to the excise tax that is imposed by the purchaser's state of residence on the nonexempt sale or use of the motor vehicle.

V. For the purposes of this section:

1. "Agricultural aircraft" means an aircraft that is built for agricultural use for the aerial application of pesticides or fertilizer or for aerial seeding.
2. "Aircraft" includes:
  - (a) An airplane flight simulator that is approved by the federal aviation administration for use as a phase II or higher flight simulator under appendix H, 14 Code of Federal Regulations part 121.
  - (b) Tangible personal property that is permanently affixed or attached as a component part of an aircraft that is owned or operated by a certificated or licensed carrier of persons or property.

3. "Other accessories and related equipment" includes aircraft accessories and equipment such as ground service equipment that physically contact aircraft at some point during the overall carrier operation.

4. "Selling at retail" means a sale for any purpose other than for resale in the regular course of business in the form of tangible personal property, but transfer of possession, lease and rental as used in the definition of sale mean only such transactions as are found on investigation to be in lieu of sales as defined without the words lease or rental.

W. For the purposes of subsection I of this section:

1. "Assembler" means a person who unites or combines products, wares or articles of manufacture so as to produce a change in form or substance without changing or altering the component parts.

2. "Manufacturer" means a person who is principally engaged in fabricating, producing or manufacturing products, wares or articles for use from raw or prepared materials, imparting to those materials new forms, qualities, properties and combinations.

3. "Modifier" means a person who reworks, changes or adds to products, wares or articles of manufacture.

4. "Overhead materials" means tangible personal property, the gross proceeds of sales or gross income derived from that would otherwise be included in the retail classification, and that are used or consumed in performing a contract, the cost of which is charged to an overhead expense account and allocated to various contracts based on generally accepted accounting principles and consistent with government contract accounting standards.

5. "Repairer" means a person who restores or renews products, wares or articles of manufacture.

6. "Subcontract" means an agreement between a contractor and any person who is not an employee of the contractor for furnishing supplies or services that, in whole or in part, are necessary to perform one or more government contracts, or under which any portion of the contractor's obligation under one or more government contracts is performed, undertaken or assumed and that includes provisions causing title to overhead materials or other tangible personal property used in performing the subcontract to pass to the government or that includes provisions incorporating such title passing clauses in a government contract into the subcontract.

**History:**



Amended by L. 2022, ch. 321,s. 7, eff. 9/23/2022. Amended by L. 2022, ch. 43,s. 3, eff. 9/23/2022. Amended by L. 2022, ch. 321,s. 8, eff. 9/23/2022. Amended by L. 2021, ch. 443,s. 3, eff. 9/29/2021. Amended by L. 2019, ch. 273,s. 7, eff. 8/27/2019. Amended by L. 2018, ch. 249,s. 1, eff. 8/3/2018. Amended by L. 2018, ch. 104,s. 15, eff. 8/3/2018. Amended by L. 2017, ch. 340,s. 4, eff. 12/31/2017. Amended by L. 2017, ch. 76,s. 11, eff. 8/9/2017. Amended by L. 2016, ch. 361,s. 5, eff. 8/5/2016. Amended by L. 2016, ch. 369,s. 2, eff. 5/19/2016. Amended by L. 2016, ch. 368,s. 1, eff. 8/5/2016. Amended by L. 2016, ch. 367,s. 2, eff. 6/30/2017. Amended by L. 2016, ch. 181,s. 1, eff. 8/5/2016. Amended by L. 2015, ch. 230,s. 8, eff. 7/2/2015. Amended by L. 2015, ch. 4,s. 10, eff. 2/24/2015, retroactive. Amended by L. 2014, ch. 276,s. 2, eff. 1/1/2015. Amended by L. 2014, ch. 215,s. 200, eff. 1/1/2015. Amended by L. 2013, ch. 255,s. 13, eff. 12/31/2014. Amended by L. 2014, ch. 211,s. 15, eff. 1/1/2015. Amended by L. 2014, ch. 54,s. 2, eff. 1/1/2015. Amended by L. 2014, ch. 54,s. 1, eff. 1/1/2014. Amended by L. 2013, ch. 233,s. 1, eff. 9/13/2013. Amended by L. 2013, ch. 120,s. 1, eff. 9/13/2013, retroactive.

**Related Legislative Provision:**

See L. 2021, ch. 443, s. 2.

See L. 2021, ch. 417, s. 5.

See L. 2021, ch. 412, s. 8.

**§ 42-3354. Return and payment by spirituous or vinous liquor wholesalers**

A. Every wholesaler of spirituous liquors selling spirituous liquors within the state shall pay the tax under this chapter on all such liquor sold within the state and add the amount of the tax to the sales price.

B. Every wholesaler of vinous liquors selling vinous liquors other than ciders as defined in section 42-3001 within this state shall pay the tax under this chapter on all such liquors sold within this state and add the amount of tax to the sales price.

C. The wholesaler shall pay the tax to the department monthly on or before the twentieth day of the month next succeeding the month in which the tax accrues.

D. On or before the date prescribed by subsection C of this section, the wholesaler shall prepare a sworn return for the month in which the tax accrues in the form prescribed by the department, showing:

1. The amount of spirituous liquors sold in this state during the month in which the tax accrues.
2. The amount of vinous liquors other than ciders as defined in section 42-3001 sold in the state during the month in which the tax accrues.
3. The amount of tax for the period covered by the return.
4. Any other information that the department deems necessary for the proper administration of this chapter.

E. The wholesaler shall deliver the return, together with a remittance of the amount of the tax due, to the department.

F. Any taxpayer that fails to pay the tax within ten days from the date on which the payment becomes due is subject to and shall pay a penalty determined under section 42-1125, plus interest at the rate determined pursuant to section 42-1123 from the time the tax was due and payable until paid.

G. For reporting periods beginning from and after December 31, 2019, or when the department has established an electronic filing program, whichever is later, each taxpayer shall file electronically any report or return required under this chapter. The report or return is considered to be filed and received by the department on the date of the electronic postmark pursuant to section 42-1105.02.

**ARS 42-3354 Return and payment by spirituous or vinous liquor  
wholesalers (Arizona Revised Statutes (2023 Edition))**

---

**History:**

Amended by L. 2017, ch. 60,s. 11, eff. 8/9/2017. Amended by L. 2014, ch.  
110,s. 3, eff. 7/24/2014.

**DEPARTMENT OF HEALTH SERVICES**

Title 9, Chapter 4, Article 6



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - FIVE-YEAR REVIEW REPORT

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 3, 2023

**SUBJECT: DEPARTMENT OF HEALTH SERVICES**  
Title 9, Chapter 4, Article 6

---

### **Summary**

This five year review report (5YRR) from the Arizona Department of Health Services covers two (2) rules in Title 9, Chapter 4, Article 6, Opioid Poisoning Related Reporting. The Department is required to develop a chronic disease surveillance system for the collection, management, and analysis of information on the incidence of chronic diseases in Arizona. Arizona was ranked 15th highest in 2020 for the rate of drug overdose deaths.

The requirements in the rules were designed to provide data that would allow a public health response to be implemented to improve the health and safety of the citizens of Arizona, including individuals experiencing an opioid overdose or neonatal abstinence syndrome (NAS).

### **Proposed Action**

The rules in Article 6 were initially made by emergency rulemaking on September 21, 2017, for 180 days and renewed and amended by emergency rulemaking for an additional 180 days on March 20, 2018. New permanent rules were made by final rulemaking with an immediate effective date of April 5, 2018.

The Department believes the rules are sufficient to protect public health and does not plan to amend the rules in 9 A.A.C. 4, Article 6 unless a threat to public health or safety arises that would require amending the rules.

**1. Has the agency analyzed whether the rules are authorized by statute?**

The Department cites both general and specific statutory authority for these rules.

**2. Summary of the agency's economic impact comparison and identification of stakeholders:**

The requirements in the rules were designed to provide data that would allow a public health response to be implemented to improve the health and safety of the citizens of Arizona, including individuals experiencing an opioid overdose or neonatal abstinence syndrome (NAS). The Department believes that rules provide a significant benefit to the general public. In reviewing the costs and benefits identified in the 2018 EIS, the Department believes that these costs and benefits are generally consistent with the actual costs and benefits of the rule.

The Department identifies stakeholders as the Department; first response agencies, including ambulance services, emergency medical services providers, and law enforcement agencies; licensed health care institutions; health professionals; medical examiners; pharmacists/pharmacies; individuals experiencing an opioid overdose or NAS and their families; and the general public.

**3. Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

According to the Department, the requirements in the rules are the minimum necessary to obtain information that continues to be important for controlling and reducing the number of opioid overdoses, which could result in death, and to ensure public health and safety. The Department believes that the protection of the health and safety of the citizens of Arizona, as well as visitors, outweighs the probable costs of the rules. The Department also believes that the rules impose the least burden and costs to persons regulated by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

**4. Has the agency received any written criticisms of the rules over the last five years?**

The Department indicates that they have not received any written criticisms of the rules in the last five years.

**5. Has the agency analyzed the rules' clarity, conciseness, and understandability?**

The Department indicates that the rules are clear, concise, and understandable.

**6. Has the agency analyzed the rules' consistency with other rules and statutes?**

The Department indicates that the rules are consistent with other rules and statutes.

**7. Has the agency analyzed the rules' effectiveness in achieving its objectives?**

The Department indicates that the rules are effective in achieving its objectives.

**8. Has the agency analyzed the current enforcement status of the rules?**

The Department indicates that the rules are enforced as written.

**9. Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

The Department indicates that the rules are not more stringent than corresponding federal law as there are no corresponding federal statutes.

**10. For rules adopted after July 29, 2010, do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Department states that the rules do not require the issuance of a permit, license, or agency authorization.

**11. Conclusion**

As stated above, the Department indicates that the rules are clear, concise, and understandable; consistent with other rules and statutes; and effective in achieving their objectives. The Department has no plans to amend the rules. The report meets the requirements of A.R.S. § 41-1056 and Council staff recommend approval of this report.



# ARIZONA DEPARTMENT OF HEALTH SERVICES

March 15, 2023

**VIA EMAIL: [grrc@azdoa.gov](mailto:grrc@azdoa.gov)**

Nicole Sornsin, Esq., Chair  
Governor's Regulatory Review Council  
Arizona Department of Administration  
100 N. 15th Avenue, Suite 305  
Phoenix, AZ 85007

RE: Department of Health Services, 9 A.A.C. 4, Article 6, Five-Year-Review Report for Noncommunicable Diseases - Opioid Poisoning-Related Reporting

Dear Ms. Sornsin:

Please find enclosed the Five-Year Review Report (Report) from the Arizona Department of Health Services (Department) for 9 A.A.C. 4, Article 6, Opioid Poisoning-Related Reporting, which is due on March 31, 2023.

The Department reviewed the rules in 9 A.A.C. 4, Article 6, with the intention that the rules do not expire pursuant to A.R.S. § 41-1056(J).

The Department hereby certifies compliance with A.R.S. § 41-1091.

For questions about this Report, please contact me at (602) 542-1020.

Sincerely,

A handwritten signature in black ink, appearing to read "Stacie Gravitto".

Stacie Gravitto  
Director's Designee

SG:lf

Enclosures

Katie Hobbs | Governor

Jennifer Cunico, MC | Acting Director





ARIZONA DEPARTMENT OF HEALTH SERVICES

Arizona Department of Health Services
Five-Year-Review Report
Title 9. Health Services
Chapter 4. Department of Health Services - Noncommunicable Diseases
Article 6. Opioid Poisoning-Related Reporting
March 2023

1. Authorization of the rule by existing statutes

General Statutory Authority: A.R.S. §§ 36-132(A)(1) and 36-136(G)

Specific Statutory Authority: A.R.S. § 36-133

2. The objective of each rule:

Table with 2 columns: Rule, Objective. Row 1: R9-4-601, To define terms used in Article 6 to assist the reader in understanding the requirements of the Article. Row 2: R9-4-602, To establish requirements for reporting an encounter with an individual with a suspected opioid overdose.

3. Are the rules effective in achieving their objectives?

Yes X No

If not, please identify the rule(s) that is not effective and provide an explanation for why the rule(s) is not effective.

Table with 2 columns: Rule, Explanation. Empty rows for input.

4. Are the rules consistent with other rules and statutes?

Yes X No

If not, please identify the rule(s) that is not consistent. Also, provide an explanation and identify the provisions that are not consistent with the rule.

Table with 2 columns: Rule, Explanation. Empty rows for input.

5. Are the rules enforced as written?

Yes X No

If not, please identify the rule(s) that is not enforced as written and provide an explanation of the issues with enforcement. In addition, include the agency's proposal for resolving the issue.

Rule	Explanation

6. **Are the rules clear, concise, and understandable?** Yes  No

*If not, please identify the rule(s) that is not clear, concise, or understandable and provide an explanation as to how the agency plans to amend the rule(s) to improve clarity, conciseness, and understandability.*

Rule	Explanation

7. **Has the agency received written criticisms of the rules within the last five years?** Yes  No

*If yes, please fill out the table below:*

Rule	Explanation

8. **Economic, small business, and consumer impact comparison:**

Arizona Revised Statutes (A.R.S.) § 36-133 requires the Arizona Department of Health Services (Department) to develop a chronic disease surveillance system for the collection, management, and analysis of information on the incidence of chronic diseases in Arizona. The Department has adopted rules to implement these statutes in Arizona Administrative Code (A.A.C.) Title 9, Chapter 4, Article 6.

In 2020, in the United States, there were an estimated 91,799 drug overdose deaths. The age-adjusted rate of overdose deaths increased by 31% from 2019 (21.6 per 100,000) to 2020 (28.3 per 100,000)<sup>1</sup>. Age-adjusting the rates ensures that differences in deaths from one year to the next are not due to differences in the age distribution of the populations being compared. Opioids, mainly synthetic opioids (other than methadone), are currently the largest driver of drug overdose deaths (82.3% of all drug overdose deaths). Opioids were involved in 68,630 overdose deaths in 2020 (74.8% of all drug overdose deaths)<sup>1</sup>. In Arizona, the number and age-adjusted rate of drug overdose deaths increased from 2018 [1,766 (25.0 per 100,000)] to 2019 [2,000 (39.8 per 100,000)]<sup>2</sup>. Relative to other states, Arizona ranked 15th highest in 2020 for the rate of drug overdose deaths<sup>3</sup>. The current report provides an update on the continued increasing trend in the number of fatal opioid-related overdoses from 2020 to 2021<sup>4</sup>.

<sup>1</sup><https://www.cdc.gov/opioids/data/index.html>

<sup>2</sup>Arizona Department of Health Services, Bureau of Public Health Statistics (2020). Health Status and Vital Statistics Annual Reports (2018-2019). <https://pub.azdhs.gov/health-stats/report/ahs/>

<sup>3</sup><https://www.cdc.gov/drugoverdose/deaths/2020.html>

<sup>4</sup><https://www.azdhs.gov/opioid/documents/opioid-surveillance-report-2020-2021.pdf>

The rules in 9 A.A.C. 4, Article 6 were initially made by emergency rulemaking published in the Arizona Administrative Register (A.A.R.) at 23 A.A.R. 2857, effective September 21, 2017, for 180 days. When the initial emergency expired, the rules were renewed and amended by emergency rulemaking at 24 A.A.R. 630, effective March 20, 2018, for 180 days. New permanent rules were made by final rulemaking at 24 A.A.R. 783, with an immediate effective date of April 5, 2018. As part of the final rulemaking, an economic, small business, and consumer impact statement (EIS) was prepared. The EIS designated annual costs/revenue changes as minimal when less than \$1,000, moderate when between \$1,000 and \$5,000, and substantial when \$5,000 or greater in additional costs or revenues. A cost or benefit was “significant” when meaningful or important, but not readily subject to quantification. The Department estimated that persons affected by the rules include the Department; first response agencies, including ambulance services, emergency medical services providers, and law enforcement agencies; licensed health care institutions; health professionals; medical examiners; pharmacists/pharmacies; individuals experiencing an opioid overdose or neonatal abstinence syndrome (NAS) and their families; and the general public.

Before promulgating the rules in Article 6, ambulance services, emergency medical services providers, and law enforcement agencies would report to the Department through the AZ-PIERS data system, while healthcare institutions, health professionals, and medical examiners report through the MEDSIS data system. Pharmacists report the dispensing of naloxone through the Arizona Board of Pharmacy’s Controlled Substances Prescription Monitoring Program (CSPMP) data system. As stated in the 2018 EIS, the Department estimated substantial costs to modify the MEDSIS data system (\$8,000) and approximately \$12,000 to permanently update the AZ-PIERS data system. Since the modifications have already been made to these systems, the Department does not anticipate further significant changes to these systems related to these rules. In addition, the Department estimated costs to compile, analyze, and produce reports on the data, as well as to disseminate other information derived from the data would impose further substantial annual costs on the Department. However, the Department estimated to receive a significant benefit from the information submitted due to the rule in implementing the activities proposed in the Opioid Action Plan, developed by the Department in compliance with the Governor’s Declaration of Emergency and Notification of Enhanced Surveillance Advisory on the Opioid Overdose Epidemic. In addition to the significant intrinsic benefit of having a healthier and safer general public as a result of public health activities undertaken by the Department to address the opioid overdose epidemic, the Department has been able to obtain federal funds to help combat the opioid overdose epidemic.

The Department estimated that the rules in Article 6 might have imposed a minimal-to-moderate cost on first response agencies, including ambulance services, emergency medical services providers, and law enforcement agencies, for reporting the required information to the Department. To help offset these costs, the Department also provided reports derived from the submitted information back to first response agencies, enabling them to improve performance and the effectiveness of their activities. Through the provision of continuing timely data, the Department believed that a first response agency might have received a significant benefit from the rules in Article 6. Reports of opioid overdose deaths were required to be reported by medical

examiners to the Department. The Department continues to work on ways to facilitate reporting from the Maricopa County medical examiner, which has by far the largest number of opioid overdose deaths. As estimated, the Department expected medical examiners of the other counties to incur minimal costs to report these deaths. Medical examiners were expected to receive a significant benefit from the reports of compiled data provided by the Department, derived from information submitted under the rules. The Department will also be expanding MEDSIS functionality for batch case entry in mid-2023, further facilitating reporting by entities with larger numbers of cases to report.

Article 6 requires licensed healthcare institutions to report suspected non-fatal opioid overdoses, suspected fatal opioid overdoses, and suspected cases of NAS. The Department anticipated that 80% of healthcare institutions would incur minimal costs for this reporting, while the largest reporting healthcare institutions might experience a minimal-to-moderate annual cost for reporting. Healthcare institutions were thought to receive a significant benefit from the reports that are disseminated by the Department, based on the information received under the rules. Health professionals were expected to incur a minimal burden due to reporting, but receive a significant benefit from additional resources available to them and their patients as a result of the public health response to the opioid overdose epidemic, which is driven by data derived through the reporting.

The requirements in the rules were designed to provide data that would allow a public health response to be implemented to improve the health and safety of the citizens of Arizona, including individuals experiencing an opioid overdose or NAS. Individuals experiencing an opioid overdose or NAS and their families were estimated to have received a significant benefit from the requirements in the rules. The Department anticipated that the timely monitoring of suspected opioid overdoses, and the effects that public health programs might have on them, could help reduce the number of opioid overdose deaths in Arizona and the number of individuals suffering an opioid overdose as a result of prescribed opioids. Therefore, the Department believes that rules provide a significant benefit to the general public. In reviewing the costs and benefits identified in the 2018 EIS, the Department believes that these costs and benefits are generally consistent with the actual costs and benefits of the rule.

9. **Has the agency received any business competitiveness analyses of the rules?** Yes \_\_\_ No X

10. **Has the agency completed the course of action indicated in the agency's previous five-year-review report?**  
*Please state what the previous course of action was and if the agency did not complete the action, please explain why not.*

Not applicable. This is the first five-year review report on these rules.

11. **A determination that the probable benefits of the rule outweigh within this state the probable costs of the rule, and the rule imposes the least burden and costs to regulated persons by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective:**

The Department believes that opioid use disorder, which can lead to opioid overdose and death, has become a chronic disease in Arizona. The requirements in the rules were designed to provide data that would allow a public

health response to be implemented to improve the health and safety of the citizens of Arizona. In 2015, prescription opioid overdose deaths reached a new high-water mark, claiming 33,000 American lives nationwide and leading to several states adopting more stringent regulations regarding opioid prescription and use. In 2016, 790 Arizonans died after suffering opioid overdoses, a figure accounting for over half of all drug overdoses in Arizona. Although the number of opioid prescriptions filled in Arizona has declined steadily since 2018<sup>5</sup>, the Department estimates that there are still hundreds of opioid prescriptions issued each day in the state, each having the potential to lead to an opioid overdose death. With opioid-related deaths increasing by 74% between 2012 and 2016, Arizona was in the midst of an opioid overdose epidemic, a public health emergency that demanded immediate attention. Despite efforts over the past years, opioid-related fatalities continued to increase through 2021. The requirements in the rules are the minimum necessary to obtain information that continues to be important for controlling and reducing the number of opioid overdoses, which could result in death, and to ensure public health and safety. The Department believes that the protection of the health and safety of the citizens of Arizona, as well as visitors, outweighs the probable costs of the rules. The Department also believes that the rules impose the least burden and costs to persons regulated by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

12. **Are the rules more stringent than corresponding federal laws?** Yes \_\_\_ No X

*Please provide a citation for the federal law(s). And if the rule(s) is more stringent, is there statutory authority to exceed the requirements of federal law(s)?*

Federal laws do not apply to the rules in 9 A.A.C. 4, Article 6.

13. **For rules adopted after July 29, 2010 that require the issuance of a regulatory permit, license, or agency authorization, whether the rules are in compliance with the general permit requirements of A.R.S. § 41-1037 or explain why the agency believes an exception applies:**

The rules do not require the issuance of a permit, license, or agency authorization.

14. **Proposed course of action**

*If possible, please identify a month and year by which the agency plans to complete the course of action.*

The Department believes the rules are sufficient to protect public health and does not plan to amend the rules in 9 A.A.C. 4, Article 6 unless a threat to public health or safety arises that would require amending the rules.

---

<sup>5</sup> <https://www.azdhs.gov/opioid/documents/opioid-surveillance-report-2020-2021.pdf>

## § R9-4-601. Definitions

In this Article, unless otherwise specified:

1. "Administrator" means the individual who is a senior leader in a health care institution or correctional facility.
2. "Ambulance service" has the same meaning as in A.R.S. §36-2201.
3. "Business day" means the period from 8:00 a.m. to 5:00 p.m. on a Monday, Tuesday, Wednesday, Thursday, or Friday that is not a state holiday.
4. "Clinical laboratory" has the same meaning as in A.R.S. §36-451.
5. "Correctional facility" has the same meaning as in A.A.C. R9-6-101.
6. "Dispense" has the same meaning as in A.R.S. §32-1901.
7. "Emergency medical services provider" has the same meaning as in A.R.S. §36-2201.
8. "First response agency" means:
  - a. An ambulance service,
  - b. An emergency medical services provider, or
  - c. A law enforcement agency.
9. "Health care institution" has the same meaning as in A.R.S. §36-401.
10. "Health professional" has the same meaning as in A.R.S. §32-3201.
11. "Law enforcement agency" has the same meaning as in A.A.C. R13-1-101.
12. "Medical examiner" has the same meaning as in A.R.S. §36-301.
13. "Naloxone" means a specific opioid antagonist that has been used since 1971 to block the effects of an opioid in an individual.
14. "Neonatal abstinence syndrome" means a set of signs of opioid withdrawal occurring in an individual shortly after birth that are indicative of opioid exposure while in the womb.
15. "Opioid" means the same as "opiate" in A.R.S. §36-2501.

16. "Opioid antagonist" means a prescription medication, as defined in A.R.S. §32-1901, that:

a. Is approved by the U.S. Department of Health and Human Services, Food and Drug Administration; and

b. When administered, reverses, in whole or in part, the pharmacological effects of an opioid in the body.

17. "Opioid overdose" means respiratory depression, slowing heart rate, or unconsciousness or mental confusion caused by the administration, including self-administration, of an opioid to an individual.

18. "Pharmacist" has the same meaning as in A.R.S. §32-1901.

**History:**

New Section made by final rulemaking at 24 A.A.R. 783, effective 4/5/2018.

**§ R9-4-602. Opioid Poisoning-Related Reporting Requirements**

A. A first response agency shall, either personally or through a representative, submit a report to the Department, in a Department-provided format and within five business days after an encounter with an individual with a suspected opioid overdose, that includes:

1. The following information about the first response agency:

a. Name;

b. Street address, city, county, and zip code;

c. Whether the first response agency reporting is:

i. An ambulance service,

ii. An emergency medical services provider, or

iii. A law enforcement agency; and

d. If applicable, the certificate number issued by the Department to the ambulance service;

2. The name, title, telephone number, and email address of a point of contact for the first response agency required to report;

3. The following information about the location at which the first response agency encountered the individual:

a. Street address or, if the location at which the first response agency encountered the individual does not have a street address, another indicator of the location at which the encounter occurred;

b. City, if applicable;

c. County;

d. State; and

e. Zip code;

4. If applicable, the date and time the first response agency was dispatched to the location specified according to subsection (A)(3);

5. The following information, as known, about the individual with a suspected opioid overdose or who died of a suspected opioid overdose:



**Ariz. Admin. Code R9-4-602 Opioid Poisoning-Related Reporting Requirements (Arizona Administrative Code (2023 Edition))**

---

- a. Name,
  - b. Date of birth,
  - c. Age in years,
  - d. Gender,
  - e. Race and ethnicity, and
  - f. Reason for suspecting that the individual had an opioid overdose;
6. Whether naloxone or another opioid antagonist designated according to A.R.S. §36-2228 was administered to the individual before the first response agency encountered the individual and, if so:
- a. The number of doses of naloxone or other opioid antagonist administered to the individual; and
  - b. As applicable, that the naloxone or other opioid antagonist was administered to the individual by:
    - i. Another individual; or
    - ii. Another first response agency and, if so the type of first response agency that administered the naloxone or other opi-oid antagonist to the individual;
7. Whether naloxone or another opioid antagonist designated according to A.R.S. §36-2228 was administered to the individual by the first response agency and, if so, the number of doses of naloxone or other opioid antagonist administered to the individual;
8. Whether the disposition of the individual was that the individual:
- a. Survived the suspected opioid overdose; or
  - b. Was pronounced dead:
    - i. At the location specified according to subsection (A)(3), or
    - ii. After leaving the location specified according to subsection (A)(3);
9. If the individual was transported by a first response agency:
- a. The type of first response agency that transported the individual; and
  - b. Whether the individual was transported to:

i. A hospital and, if so, the name of the hospital to which the individual was transported;

ii. Another class of health care institution and, if so, the name of the health care institution to which the individual was transported; or

iii. A correctional facility and, if so, the name of the correctional facility to which the individual was transported; and

10. The date of the report.

B. The following are not required to submit a report under this Article:

1. An administrator of a health care institution licensed under 9 A.A.C. 10, for an opioid overdose resulting from the administration of the opioid to a patient in the health care institution if the opioid overdose is addressed through the health care institution's quality management program; or

2. A pharmacist for naloxone or another opioid antagonist that is dispensed in connection with a surgical procedure, as defined in A.A.C. R9-10-101, or other invasive procedure performed in a health care institution.

C. Except as prohibited by Title 42 Code of Federal Regulations, Chapter I, Subchapter A, Part 2 or as specified in subsection (B), a health professional or the administrator of a health care institution licensed under 9 A.A.C. 10 shall, either personally or through a representative, submit a report to the Department, in a Department-provided format and within five business days after an encounter with an individual with a suspected opioid overdose, that includes:

1. The name, street address, city, county, zip code, and telephone number of the health professional or health care institution;

2. If different from the person in subsection (C)(1), the name, title, telephone number, and email address of the individual reporting on behalf of the person in subsection (C)(1);

3. The following information about the individual with a suspected opioid overdose:

a. The individual's name;

b. The individual's street address, city, county, state, and zip code;

c. The individual's date of birth;

d. The individual's gender;

- e. The individual's race and ethnicity;
  - f. Whether the individual is pregnant and, if so, the expected date of delivery;
  - g. If applicable, the name of the individual's guardian; and
  - h. Whether naloxone or another opioid antagonist designated according to A.R.S. §36-2228 was administered to the individual before the health professional or health care institution encountered the individual and, if so:
  - i. The type of first response agency that administered the naloxone or other opioid antagonist to the individual, or
  - ii. That the naloxone or other opioid antagonist was administered to the individual by another individual;
4. The following information about the diagnosis of opioid overdose:
- a. The reason for suspecting that the individual had an opioid overdose;
  - b. The date of the suspected opioid overdose;
  - c. The date of diagnosis; and
  - d. If the diagnosis was confirmed through one or more tests performed by a clinical laboratory, for each test:
    - i. The name, address, and telephone number of the clinical laboratory;
    - ii. The date a specimen was collected from the individual;
    - iii. The type of specimen collected;
    - iv. The type of laboratory test performed; and
    - v. The laboratory test result and date of the result;
5. The following information about the suspected opioid overdose:
- a. Whether the opioid overdose appeared to be intentional or unintentional;
  - b. The location where the opioid overdose took place;
  - c. Whether the individual was alone at the time of the opioid overdose;

- d. Whether the individual was transported to the health professional or health care institution by a first response agency and, if so, the type of first response agency that transported the individual;
  - e. The specific opioid that appeared to be responsible for the opioid overdose; and
  - f. If known, whether:
    - i. The individual was prescribed an opioid within the 90 calendar days before the date of the suspected opioid overdose;
    - ii. The individual had been referred to receive behavioral health services, as defined in A.R.S. §36-401; or
    - iii. The opioid overdose was the first time the individual had had an opioid overdose and, if not, the number of previous opioid overdoses the individual was known to have had;
6. Whether the individual with the suspected opioid overdose:
- a. Survived the suspected opioid overdose and:
    - i. Was admitted to the health care institution;
    - ii. Was transferred to another health care institution and, if so, the name of the health care institution;
    - iii. Was discharged to a law enforcement agency or correctional facility and, if so, the name of the law enforcement agency or correctional facility;
    - iv. Was discharged to home; or
    - v. Left the health care institution against medical advice; or
  - b. Died and, if so, the date of death; and
7. The date of the report.
- D. Except as prohibited by Title 42 Code of Federal Regulations, Chapter I, Subchapter A, Part 2, a health professional or the administrator of a health care institution licensed under 9 A.A.C. 10 shall, either personally or through a representative, submit a report to the Department, in a Department-provided format and within five business days after an encounter with an individual with suspected neonatal abstinence syndrome, that includes:

**Ariz. Admin. Code R9-4-602 Opioid Poisoning-Related Reporting Requirements (Arizona Administrative Code (2023 Edition))**

---

1. The name, street address, city, county, zip code, and telephone number of the health professional or health care institution;
2. If different from the person in subsection (D)(1), the name, title, telephone number, and email address of the individual reporting on behalf of the person in subsection (D)(1);
3. The following information about the individual with suspected neonatal abstinence syndrome:
  - a. The individual's name;
  - b. The individual's date of birth;
  - c. The individual's gender;
  - d. The individual's race and ethnicity;
  - e. The name of the individual's mother; and
  - f. If not the individual's mother, the name of the individual's guardian;
4. The following information about a diagnosis of neonatal abstinence syndrome:
  - a. The reason for suspecting that the individual has neonatal abstinence syndrome;
  - b. The date of the onset of signs of neonatal abstinence syndrome;
  - c. The date of diagnosis;
  - d. If the diagnosis was confirmed through one or more tests performed by a clinical laboratory, for each test:
    - i. The name, address, and telephone number of the clinical laboratory;
    - ii. The date a specimen was collected from the individual;
    - iii. The type of specimen collected;
    - iv. The type of laboratory test performed; and
    - v. The laboratory test result and date of the result; and
  - e. Whether any of the following supported a diagnosis of neonatal abstinence syndrome:

- i. A maternal history of opioid use,
  - ii. A positive laboratory test for opioid use by the individual's mother, or
  - iii. A positive laboratory test for opioids in the individual;
5. If known, the following information about the suspected neonatal abstinence syndrome:
- a. The source of the opioid believed to have caused the neonatal abstinence syndrome; and
  - b. If the source of the opioid used by the individual's mother was not through a prescription order, as defined in A.R.S. §32-1901, the specific opioid used by the individual's mother; and
6. The date of the report.
- E. A pharmacist who dispenses naloxone or another opioid antagonist to an individual according to A.R.S. §32-1979 shall, either personally or through a representative, submit a report as required in A.R.S. §32-1979 to document the dispensing.
- F. A medical examiner shall, either personally or through a representative, submit a report to the Department, in a Department-provided format and within five business days after the completion of the death investigation required in A.R.S. §11-594 on the human remains of a deceased individual with a suspected opioid overdose, that includes:
1. The following information about the medical examiner:
    - a. Name; and
    - b. Street address, city, county, and zip code;
  2. The following information about the deceased individual with a suspected opioid overdose:
    - a. The deceased individual's name;
    - b. The deceased individual's date of birth;
    - c. The deceased individual's gender;
    - d. The deceased individual's race and ethnicity;

- e. Whether the deceased individual was pregnant and, if so, the expected date of delivery;
- f. If applicable, the name of the deceased individual's guardian; and
- g. Whether naloxone or another opioid antagonist was administered to the deceased individual before the deceased individual's death and, if known:
  - i. The type of first response agency that administered the naloxone or other opioid antagonist to the deceased individual, or
  - ii. That the naloxone or other opioid antagonist was administered to the deceased individual by another individual;
- 3. The following information about the diagnosis of opioid overdose:
  - a. The reason for suspecting that the deceased individual had an opioid overdose;
  - b. The date of the opioid overdose;
  - c. The date of diagnosis; and
  - d. If the diagnosis was confirmed by clinical laboratory tests:
    - i. The name, address, and telephone number of the clinical laboratory;
    - ii. The date a specimen was collected from the deceased individual;
    - iii. The type of specimen collected;
    - iv. The type of laboratory test performed; and
    - v. The laboratory test result and date of the result;
- 4. If applicable, a copy of the clinical laboratory test results;
- 5. If known, the following information about the suspected opioid overdose:
  - a. Whether the opioid overdose appeared to be intentional or unintentional;
  - b. The location where the opioid overdose took place;
  - c. Whether the deceased individual was alone at the time of the opioid overdose;
  - d. The specific opioid that appeared to be responsible for the opioid overdose;

**Ariz. Admin. Code R9-4-602 Opioid Poisoning-Related Reporting  
Requirements (Arizona Administrative Code (2023 Edition))**

---

e. Whether the deceased individual was prescribed an opioid within the 90 calendar days before the date of the opioid overdose; and

f. Whether the opioid overdose was the first time the deceased individual was known to have had an opioid overdose and, if not, the number of previous opioid overdoses the deceased individual had had;

6. Whether the deceased individual with the suspected opioid overdose:

a. Died from the suspected opioid overdose and, if so, the date of death; or

b. Died from another cause after experiencing a suspected opioid overdose and, if so, the date of death; and

7. The date of the report.

G. Information collected on individuals pursuant to this Article is confidential according to:

1. A.R.S. §36-133(F); and

2. If applicable, A.R.S. §§36-2401 through 36-2403.

**History:**

New Section made by final rulemaking at 24 A.A.R. 783, effective 4/5/2018.



## Statutory Authority

### 36-132. [Department of health services; functions; contracts](#)

A. The department, in addition to other powers and duties vested in it by law, shall:

1. Protect the health of the people of the state.
2. Promote the development, maintenance, efficiency and effectiveness of local health departments or districts of sufficient population and area that they can be sustained with reasonable economy and efficient administration, provide technical consultation and assistance to local health departments or districts, provide financial assistance to local health departments or districts and services that meet minimum standards of personnel and performance and in accordance with a plan and budget submitted by the local health department or districts to the department for approval, and recommend the qualifications of all personnel.
3. Collect, preserve, tabulate and interpret all information required by law in reference to births, deaths and all vital facts, and obtain, collect and preserve information relating to the health of the people of this state and the prevention of diseases as may be useful in the discharge of functions of the department not in conflict with chapter 3 of this title and sections 36-693, 36-694 and 39-122.
4. Operate such sanitariums, hospitals or other facilities assigned to the department by law or by the governor.
5. Conduct a statewide program of health education relevant to the powers and duties of the department, prepare educational materials and disseminate information as to conditions affecting health, including basic information for the promotion of good health on the part of individuals and communities, and prepare and disseminate technical information concerning public health to the health professions, local health officials and hospitals. In cooperation with the department of education, the department of health services shall prepare and disseminate materials and give technical assistance for the purpose of education of children in hygiene, sanitation and personal and public health, and provide consultation and assistance in community organization to counties, communities and groups of people.
6. Administer or supervise a program of public health nursing, prescribe the minimum qualifications of all public health nurses engaged in official public health work, and encourage and aid in coordinating local public health nursing services.
7. Encourage and aid in coordinating local programs concerning control of preventable diseases in accordance with statewide plans that shall be formulated by the department.
8. Encourage and aid in coordinating local programs concerning maternal and child health, including midwifery, antepartum and postpartum care, infant and preschool health and the health of

schoolchildren, including special fields such as the prevention of blindness and conservation of sight and hearing.

9. Encourage and aid in the coordination of local programs concerning nutrition of the people of this state.

10. Encourage, administer and provide dental health care services and aid in coordinating local programs concerning dental public health, in cooperation with the Arizona dental association. The department may bill and receive payment for costs associated with providing dental health care services and shall deposit the monies in the oral health fund established by section 36-138.

11. Establish and maintain adequate serological, bacteriological, parasitological, entomological and chemical laboratories with qualified assistants and facilities necessary for routine examinations and analyses and for investigations and research in matters affecting public health.

12. Supervise, inspect and enforce the rules concerning the operation of public bathing places and public and semipublic swimming pools adopted pursuant to section 36-136, subsection I, paragraph 10.

13. Take all actions necessary or appropriate to ensure that bottled water sold to the public and water used to process, store, handle, serve and transport food and drink are free from filth, disease-causing substances and organisms and unwholesome, poisonous, deleterious or other foreign substances. All state agencies and local health agencies involved with water quality shall provide to the department any assistance requested by the director to ensure that this paragraph is effectuated.

14. Enforce the state food, caustic alkali and acid laws in accordance with chapter 2, article 2 of this title, chapter 8, article 1 of this title and chapter 9, article 4 of this title, and collaborate in the enforcement of the federal food, drug, and cosmetic act (52 Stat. 1040; 21 United States Code sections 1 through 905).

15. Recruit and train personnel for state, local and district health departments.

16. Conduct continuing evaluations of state, local and district public health programs, study and appraise state health problems and develop broad plans for use by the department and for recommendation to other agencies, professions and local health departments for the best solution of these problems.

17. License and regulate health care institutions according to chapter 4 of this title.

18. Issue or direct the issuance of licenses and permits required by law.

19. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.

20. Subject to the availability of monies, develop and administer programs in perinatal health care, including:

- (a) Screening in early pregnancy for detecting high-risk conditions.
- (b) Comprehensive prenatal health care.
- (c) Maternity, delivery and postpartum care.
- (d) Perinatal consultation, including transportation of the pregnant woman to a perinatal care center when medically indicated.
- (e) Perinatal education oriented toward professionals and consumers, focusing on early detection and adequate intervention to avert premature labor and delivery.

21. License and regulate the health and safety of group homes for persons with developmental disabilities. The department shall issue a license to an accredited facility for a period of the accreditation, except that no licensing period shall be longer than three years. The department is authorized to conduct an inspection of an accredited facility to ensure that the facility meets health and safety licensure standards. The results of the accreditation survey shall be public information. A copy of the final accreditation report shall be filed with the department of health services. For the purposes of this paragraph, "accredited" means accredited by a nationally recognized accreditation organization.

B. The department may accept from the state or federal government, or any agency of the state or federal government, and from private donors, trusts, foundations or eleemosynary corporations or organizations grants or donations for or in aid of the construction or maintenance of any program, project, research or facility authorized by this title, or in aid of the extension or enforcement of any program, project or facility authorized, regulated or prohibited by this title, and enter into contracts with the federal government, or an agency of the federal government, and with private donors, trusts, foundations or eleemosynary corporations or organizations, to carry out such purposes. All monies made available under this section are special project grants. The department may also expend these monies to further applicable scientific research within this state.

C. The department, in establishing fees authorized by this section, shall comply with title 41, chapter 6. The department shall not set a fee at more than the department's cost of providing the service for which the fee is charged. State agencies are exempt from all fees imposed pursuant to this section.

D. The department may enter into contracts with organizations that perform nonrenal organ transplant operations and organizations that primarily assist in the management of end-stage renal disease and related problems to provide, as payors of last resort, prescription medications necessary to supplement treatment and transportation to and from treatment facilities. The contracts may provide for department payment of administrative costs it specifically authorizes.

36-136. Powers and duties of director; compensation of personnel; rules; definitions

A. The director shall:

1. Be the executive officer of the department of health services and the state registrar of vital statistics but shall not receive compensation for services as registrar.
2. Perform all duties necessary to carry out the functions and responsibilities of the department.
3. Prescribe the organization of the department. The director shall appoint or remove personnel as necessary for the efficient work of the department and shall prescribe the duties of all personnel. The director may abolish any office or position in the department that the director believes is unnecessary.
4. Administer and enforce the laws relating to health and sanitation and the rules of the department.
5. Provide for the examination of any premises if the director has reasonable cause to believe that on the premises there exists a violation of any health law or rule of this state.
6. Exercise general supervision over all matters relating to sanitation and health throughout this state. When in the opinion of the director it is necessary or advisable, a sanitary survey of the whole or of any part of this state shall be made. The director may enter, examine and survey any source and means of water supply, sewage disposal plant, sewerage system, prison, public or private place of detention, asylum, hospital, school, public building, private institution, factory, workshop, tenement, public washroom, public restroom, public toilet and toilet facility, public eating room and restaurant, dairy, milk plant or food manufacturing or processing plant, and any premises in which the director has reason to believe there exists a violation of any health law or rule of this state that the director has the duty to administer.
7. Prepare sanitary and public health rules.
8. Perform other duties prescribed by law.

B. If the director has reasonable cause to believe that there exists a violation of any health law or rule of this state, the director may inspect any person or property in transportation through this state, and any car, boat, train, trailer, airplane or other vehicle in which that person or property is transported, and may enforce detention or disinfection as reasonably necessary for the public health if there exists a violation of any health law or rule.

C. The director, after consultation with the department of administration, may take all necessary steps to enhance the highest and best use of the state hospital property, including contracting with third parties to provide services, entering into short-term lease agreements with third parties to

occupy or renovate existing buildings and entering into long-term lease agreements to develop the land and buildings. The director shall deposit any monies collected from contracts and lease agreements entered into pursuant to this subsection in the Arizona state hospital charitable trust fund established by section 36-218. At least thirty days before issuing a request for proposals pursuant to this subsection, the department of health services shall hold a public hearing to receive community and provider input regarding the highest and best use of the state hospital property related to the request for proposals. The department shall report to the joint committee on capital review on the terms, conditions and purpose of any lease or sublease agreement entered into pursuant to this subsection relating to state hospital lands or buildings or the disposition of real property pursuant to this subsection, including state hospital lands or buildings, and the fiscal impact on the department and any revenues generated by the agreement. Any lease or sublease agreement entered into pursuant to this subsection relating to state hospital lands or buildings or the disposition of real property pursuant to this subsection, including state hospital lands or buildings, must be reviewed by the joint committee on capital review.

D. The director may deputize, in writing, any qualified officer or employee in the department to do or perform on the director's behalf any act the director is by law empowered to do or charged with the responsibility of doing.

E. The director may delegate to a local health department, county environmental department or public health services district any functions, powers or duties that the director believes can be competently, efficiently and properly performed by the local health department, county environmental department or public health services district if:

1. The director or superintendent of the local health agency, environmental agency or public health services district is willing to accept the delegation and agrees to perform or exercise the functions, powers and duties conferred in accordance with the standards of performance established by the director of the department of health services.

2. Monies appropriated or otherwise made available to the department for distribution to or division among counties or public health services districts for local health work may be allocated or reallocated in a manner designed to ensure the accomplishment of recognized local public health activities and delegated functions, powers and duties in accordance with applicable standards of performance. If in the director's opinion there is cause, the director may terminate all or a part of any delegation and may reallocate all or a part of any funds that may have been conditioned on the further performance of the functions, powers or duties conferred.

F. The compensation of all personnel shall be as determined pursuant to section 38-611.

G. The director may make and amend rules necessary for the proper administration and enforcement of the laws relating to the public health.

H. Notwithstanding subsection I, paragraph 1 of this section, the director may define and prescribe emergency measures for detecting, reporting, preventing and controlling communicable or

infectious diseases or conditions if the director has reasonable cause to believe that a serious threat to public health and welfare exists. Emergency measures are effective for not longer than eighteen months.

I. The director, by rule, shall:

1. Define and prescribe reasonably necessary measures for detecting, reporting, preventing and controlling communicable and preventable diseases. The rules shall declare certain diseases reportable. The rules shall prescribe measures, including isolation or quarantine, that are reasonably required to prevent the occurrence of, or to seek early detection and alleviation of, disability, insofar as possible, from communicable or preventable diseases. The rules shall include reasonably necessary measures to control animal diseases transmittable to humans.

2. Define and prescribe reasonably necessary measures, in addition to those prescribed by law, regarding the preparation, embalming, cremation, interment, disinterment and transportation of dead human bodies and the conduct of funerals, relating to and restricted to communicable diseases and regarding the removal, transportation, cremation, interment or disinterment of any dead human body.

3. Define and prescribe reasonably necessary procedures that are not inconsistent with law in regard to the use and accessibility of vital records, delayed birth registration and the completion, change and amendment of vital records.

4. Except as relating to the beneficial use of wildlife meat by public institutions and charitable organizations pursuant to title 17, prescribe reasonably necessary measures to ensure that all food or drink, including meat and meat products and milk and milk products sold at the retail level, provided for human consumption is free from unwholesome, poisonous or other foreign substances and filth, insects or disease-causing organisms. The rules shall prescribe reasonably necessary measures governing the production, processing, labeling, storing, handling, serving and transportation of these products. The rules shall prescribe minimum standards for the sanitary facilities and conditions that shall be maintained in any warehouse, restaurant or other premises, except a meat packing plant, slaughterhouse, wholesale meat processing plant, dairy product manufacturing plant or trade product manufacturing plant. The rules shall prescribe minimum standards for any truck or other vehicle in which food or drink is produced, processed, stored, handled, served or transported. The rules shall provide for the inspection and licensing of premises and vehicles so used, and for abatement as public nuisances of any premises or vehicles that do not comply with the rules and minimum standards. The rules shall provide an exemption relating to food or drink that is:

(a) Served at a noncommercial social event such as a potluck.

(b) Prepared at a cooking school that is conducted in an owner-occupied home.

(c) Not potentially hazardous and prepared in a kitchen of a private home for occasional sale or distribution for noncommercial purposes.

(d) Prepared or served at an employee-conducted function that lasts less than four hours and is not regularly scheduled, such as an employee recognition, an employee fundraising or an employee social event.

(e) Offered at a child care facility and limited to commercially prepackaged food that is not potentially hazardous and whole fruits and vegetables that are washed and cut on-site for immediate consumption.

(f) Offered at locations that sell only commercially prepackaged food or drink that is not potentially hazardous.

(g) A cottage food product that is not potentially hazardous or a time or temperature control for safety food and that is prepared in a kitchen of a private home for commercial purposes, including fruit jams and jellies, dry mixes made with ingredients from approved sources, honey, dry pasta and roasted nuts. Cottage food products must be packaged at home with an attached label that clearly states the name and registration number of the food preparer, lists all the ingredients in the product and the product's production date and includes the following statement: "This product was produced in a home kitchen that may process common food allergens and is not subject to public health inspection." If the product was made in a facility for individuals with developmental disabilities, the label must also disclose that fact. The person preparing the food or supervising the food preparation must complete a food handler training course from an accredited program and maintain active certification. The food preparer must register with an online registry established by the department pursuant to paragraph 13 of this subsection. The food preparer must display the preparer's certificate of registration when operating as a temporary food establishment. For the purposes of this subdivision, "not potentially hazardous" means cottage food products that meet the requirements of the food code published by the United States food and drug administration, as modified and incorporated by reference by the department by rule.

(h) A whole fruit or vegetable grown in a public school garden that is washed and cut on-site for immediate consumption.

(i) Produce in a packing or holding facility that is subject to the United States food and drug administration produce safety rule (21 Code of Federal Regulations part 112) as administered by the Arizona department of agriculture pursuant to title 3, chapter 3, article 4.1. For the purposes of this subdivision, "holding", "packing" and "produce" have the same meanings prescribed in section 3-525.

(j) Spirituous liquor produced on the premises licensed by the department of liquor licenses and control. This exemption includes both of the following:

(i) The area in which production and manufacturing of spirituous liquor occurs, as defined in an active basic permit on file with the United States alcohol and tobacco tax and trade bureau.

(ii) The area licensed by the department of liquor licenses and control as a microbrewery, farm winery or craft distiller that is open to the public and serves spirituous liquor and commercially prepackaged food, crackers or pretzels for consumption on the premises. A producer of spirituous liquor may not provide, allow or expose for common use any cup, glass or other receptacle used for drinking purposes. For the purposes of this item, "common use" means the use of a drinking receptacle for drinking purposes by or for more than one person without the receptacle being thoroughly cleansed and sanitized between consecutive uses by methods prescribed by or acceptable to the department.

5. Prescribe reasonably necessary measures to ensure that all meat and meat products for human consumption handled at the retail level are delivered in a manner and from sources approved by the Arizona department of agriculture and are free from unwholesome, poisonous or other foreign substances and filth, insects or disease-causing organisms. The rules shall prescribe standards for sanitary facilities to be used in identity, storage, handling and sale of all meat and meat products sold at the retail level.

6. Prescribe reasonably necessary measures regarding production, processing, labeling, handling, serving and transportation of bottled water to ensure that all bottled drinking water distributed for human consumption is free from unwholesome, poisonous, deleterious or other foreign substances and filth or disease-causing organisms. The rules shall prescribe minimum standards for the sanitary facilities and conditions that shall be maintained at any source of water, bottling plant and truck or vehicle in which bottled water is produced, processed, stored or transported and shall provide for inspection and certification of bottled drinking water sources, plants, processes and transportation and for abatement as a public nuisance of any water supply, label, premises, equipment, process or vehicle that does not comply with the minimum standards. The rules shall prescribe minimum standards for bacteriological, physical and chemical quality for bottled water and for the submission of samples at intervals prescribed in the standards.

7. Define and prescribe reasonably necessary measures governing ice production, handling, storing and distribution to ensure that all ice sold or distributed for human consumption or for preserving or storing food for human consumption is free from unwholesome, poisonous, deleterious or other foreign substances and filth or disease-causing organisms. The rules shall prescribe minimum standards for the sanitary facilities and conditions and the quality of ice that shall be maintained at any ice plant, storage and truck or vehicle in which ice is produced, stored, handled or transported and shall provide for inspection and licensing of the premises and vehicles, and for abatement as public nuisances of ice, premises, equipment, processes or vehicles that do not comply with the minimum standards.

8. Define and prescribe reasonably necessary measures concerning sewage and excreta disposal, garbage and trash collection, storage and disposal, and water supply for recreational and summer camps, campgrounds, motels, tourist courts, trailer coach parks and hotels. The rules shall prescribe minimum standards for preparing food in community kitchens, adequacy of excreta disposal, garbage and trash collection, storage and disposal and water supply for recreational and summer camps, campgrounds, motels, tourist courts, trailer coach parks and hotels and shall provide for inspection of these premises and for abatement as public nuisances of any premises or facilities that do not comply with the rules. Primitive camp and picnic grounds offered by this state or a political



subdivision of this state are exempt from rules adopted pursuant to this paragraph but are subject to approval by a county health department under sanitary regulations adopted pursuant to section 36-183.02. Rules adopted pursuant to this paragraph do not apply to two or fewer recreational vehicles as defined in section 33-2102 that are not park models or park trailers, that are parked on owner-occupied residential property for less than sixty days and for which no rent or other compensation is paid. For the purposes of this paragraph, "primitive camp and picnic grounds" means camp and picnic grounds that are remote in nature and without accessibility to public infrastructure such as water, electricity and sewer.

9. Define and prescribe reasonably necessary measures concerning the sewage and excreta disposal, garbage and trash collection, storage and disposal, water supply and food preparation of all public schools. The rules shall prescribe minimum standards for sanitary conditions that shall be maintained in any public school and shall provide for inspection of these premises and facilities and for abatement as public nuisances of any premises that do not comply with the minimum standards.

10. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious health conditions at these places. The rules shall prescribe minimum standards for sanitary conditions that shall be maintained at any public or semipublic swimming pool or bathing place and shall provide for inspection of these premises and for abatement as public nuisances of any premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of environmental quality and shall be consistent with the rules adopted by the director of the department of environmental quality pursuant to section 49-104, subsection B, paragraph 12.

11. Prescribe reasonably necessary measures to keep confidential information relating to diagnostic findings and treatment of patients, as well as information relating to contacts, suspects and associates of communicable disease patients. In no event shall confidential information be made available for political or commercial purposes.

12. Prescribe reasonably necessary measures regarding human immunodeficiency virus testing as a means to control the transmission of that virus, including the designation of anonymous test sites as dictated by current epidemiologic and scientific evidence.

13. Establish an online registry of food preparers that are authorized to prepare cottage food products for commercial purposes pursuant to paragraph 4 of this subsection. A registered food preparer shall renew the registration every three years and shall provide to the department updated registration information within thirty days after any change.

14. Prescribe an exclusion for fetal demise cases from the standardized survey known as "the hospital consumer assessment of healthcare providers and systems".

J. The rules adopted under the authority conferred by this section shall be observed throughout the state and shall be enforced by each local board of health or public health services district, but this section does not limit the right of any local board of health or county board of supervisors to adopt

ordinances and rules as authorized by law within its jurisdiction, provided that the ordinances and rules do not conflict with state law and are equal to or more restrictive than the rules of the director.

K. The powers and duties prescribed by this section do not apply in instances in which regulatory powers and duties relating to public health are vested by the legislature in any other state board, commission, agency or instrumentality, except that with regard to the regulation of meat and meat products, the department of health services and the Arizona department of agriculture within the area delegated to each shall adopt rules that are not in conflict.

L. The director, in establishing fees authorized by this section, shall comply with title 41, chapter 6. The department shall not set a fee at more than the department's cost of providing the service for which the fee is charged. State agencies are exempt from all fees imposed pursuant to this section.

M. After consultation with the state superintendent of public instruction, the director shall prescribe the criteria the department shall use in deciding whether or not to notify a local school district that a pupil in the district has tested positive for the human immunodeficiency virus antibody. The director shall prescribe the procedure by which the department shall notify a school district if, pursuant to these criteria, the department determines that notification is warranted in a particular situation. This procedure shall include a requirement that before notification the department shall determine to its satisfaction that the district has an appropriate policy relating to nondiscrimination of the infected pupil and confidentiality of test results and that proper educational counseling has been or will be provided to staff and pupils.

N. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (f) of this section, food and drink are exempt from the rules prescribed in subsection I of this section if offered at locations that sell only commercially prepackaged food or drink that is not potentially hazardous, without a limitation on its display area.

O. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (h) of this section, a whole fruit or vegetable grown in a public school garden that is washed and cut on-site for immediate consumption is exempt from the rules prescribed in subsection I of this section.

P. Until the department adopts an exclusion by rule as required by subsection I, paragraph 14 of this section, the standardized survey known as "the hospital consumer assessment of healthcare providers and systems" may not include patients who experience a fetal demise.

Q. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (j) of this section, spirituous liquor and commercially prepackaged food, crackers or pretzels that meet the requirements of subsection I, paragraph 4, subdivision (j) of this section are exempt from the rules prescribed in subsection I of this section.

R. For the purposes of this section:

1. "Cottage food product":

(a) Means a food that is not potentially hazardous or a time or temperature control for safety food as defined by the department in rule and that is prepared in a home kitchen by an individual who is registered with the department.

(b) Does not include foods that require refrigeration, perishable baked goods, salsas, sauces, fermented and pickled foods, meat, fish and shellfish products, beverages, acidified food products, nut butters or other reduced-oxygen packaged products.

2. "Fetal demise" means a fetal death that occurs or is confirmed in a licensed hospital. Fetal demise does not include an abortion as defined in section 36-2151.

36-133. Chronic disease surveillance system; confidentiality; immunity; violation; classification

A. A central statewide chronic disease surveillance system is established in the department. Diseases in the surveillance system shall include cancer, birth defects and other chronic diseases required by the director to be reported to the department.

B. The department, in establishing the surveillance system, shall:

1. Provide a chronic disease information system.

2. Provide a mechanism for patient follow-up.

3. Promote and assist hospital cancer registries.

4. Improve the quality of information gathered relating to the detection, diagnosis and treatment of patients with cancer, birth defects and other diseases included in the surveillance system.

5. Monitor the incidence patterns of diseases included in the surveillance system.

6. Pursuant to rules adopted by the director, establish procedures for reporting diseases included in the surveillance system.

7. Identify population subgroups at high risk for cancer, birth defects and other diseases included in the surveillance system.

8. Identify regions of this state that need intervention programs or epidemiological research, detection and prevention.

9. Establish a data management system to perform various studies, including epidemiological studies, and to provide biostatistic and epidemiologic information to the medical community relating to diseases in the surveillance system.

C. A person who provides a case report to the surveillance system or who uses case information from the system authorized pursuant to this section is not subject to civil liability with respect to providing the case report or accessing information in the system.

D. The department may authorize other persons and organizations to use surveillance data:

1. To study the sources and causes of cancer, birth defects and other chronic diseases.

2. To evaluate the cost, quality, efficacy and appropriateness of diagnostic, therapeutic, rehabilitative and preventive services and programs related to cancer, birth defects and other chronic diseases.

E. The department of health services and the Arizona early intervention program in the department of economic security may use surveillance data to notify the families of children with birth defects regarding services that are available to them and provide these families with information about organizations that provide services to these children and their families.

F. Information collected on individuals by the surveillance system that can identify an individual is confidential and may be used only pursuant to this section. A person who discloses confidential information in violation of this section is guilty of a class 3 misdemeanor.

**DEPARTMENT OF HEALTH SERVICES**  
Title 9, Chapter 10, Article 9



# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - FIVE-YEAR REVIEW REPORT

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 14, 2023

**SUBJECT:** Department of Health Services  
Title 9, Chapter 10, Article 9

---

This Five-Year-Review Report (5YRR) from the Department of Health Services relates to rules in Title 9, Chapter 10, Article 9 regarding Outpatient Surgical Centers.

The Department did not propose any changes to the rules in the last 5YRR of these rules.

### **Proposed Action**

The Department is proposing to amend two of its rules, R9-10-902 and R9-10-911, in order to comply with recent statutory changes. The Department plans to submit a Notice of Final Rulemaking to the Council by October 2023.

**1. Has the agency analyzed whether the rules are authorized by statute?**

Yes, the Department cites to both general and specific statutory authority.

**2. Summary of the agency's economic impact comparison and identification of stakeholders:**

The Department states that the Arizona Administrative Code (A.A.C.) Title 9, Chapter 10, Article 9 contains 18 rules that establish the requirements and minimum standards for outpatient surgical centers. The Department indicates that the rules in 9 A.A.C. 10, Article 9 were made new in their entirety in 2013 as part of an exempt rulemaking of 9 A.A.C. 10 and 9 A.A.C 20 to comply with Laws 2011, Ch. 96. Additionally, in 2014, six of the rules in Article 9 were revised through exempt rulemaking to comply with Laws 2013 Ch. 10, effective July 1, 2014. No economic, small business, and consumer impact statements were prepared as a part of the exempt rulemakings. The Department believes stakeholders are the Department, outpatient surgical centers, physicians and other health care providers, patients and the general public.

The Department states that currently there are 271 licensed outpatient surgical center health care institutions in the state. In 2022, the Department received and approved 39 applications and 232 facilities paid annual licensing fees.

**3. Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Department has determined that the rules impose the least burden and costs to persons regulated by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

**4. Has the agency received any written criticisms of the rules over the last five years?**

No, the Department indicates they did not receive any written criticisms to the rules.

**5. Has the agency analyzed the rules' clarity, conciseness, and understandability?**

Yes, the Department indicates the rules are overall clear, concise, and understandable.

**6. Has the agency analyzed the rules' consistency with other rules and statutes?**

Yes, the Department indicates the rules are overall consistent with other rules and statutes with the exception of the following:

**R9-10-902** - Administration  
**R9-10-911** - Surgical Services

**7. Has the agency analyzed the rules' effectiveness in achieving its objectives?**

Yes, the Department indicates the rules are overall effective in achieving their objectives.

**8. Has the agency analyzed the current enforcement status of the rules?**

Yes, the Department indicates the rules are enforced as written.

9. **Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

No, the Department indicates the rules are not more stringent than federal laws.

10. **For rules adopted after July 29, 2010, do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The Department indicates the rules are authorized by A.R.S. 36-405, and a general permit is not applicable.

11. **Conclusion**

As mentioned above, the Department indicates it plans to amend three of their rules in order to comply with recent statutory changes. The Department plans to submit a Notice of Final Rulemaking to the Council by October 2023.

Council staff recommends approval of this report.





# ARIZONA DEPARTMENT OF HEALTH SERVICES

February 21, 2023

**VIA: E-MAIL: [grrc@azdoa.gov](mailto:grrc@azdoa.gov)**

Nicole Sornsin, Chairperson  
Governor's Regulatory Review Council  
Arizona Department of Administration  
100 North 15th Avenue, Suite 305  
Phoenix, Arizona 85007

RE: ADHS, A.A.C. Title 9, Chapter 10, Article 9 Five Year Review Report

Dear Ms. Sornsin:

Please find enclosed the Five-Year Review Report from the Arizona Department of Health Services (Department) for A.A.C. Title 9, Chapter 10 Health Care Institutions, Article 9 Outpatient Surgical Centers which is due on February 28, 2023.

The Department reviewed the following rules in A.A.C. Title 9, Chapter 10, Article 9 with the intention that those rules do not expire under A.R.S. § 41-1056(J).

The Department hereby certifies compliance with A.R.S. § 41-1091.

For questions about this report, please contact Emily Carey at 602-542-5121 or [emily.carey@azdhs.gov](mailto:emily.carey@azdhs.gov).

Sincerely,

  
Stacie Gravito  
Director's Designee

RL: tk  
Enclosures

Douglas A. Ducey | Governor Don Herrington | Interim Director



ARIZONA DEPARTMENT  
OF HEALTH SERVICES

## Arizona Department of Health Services

### Five-Year-Review Report

#### Title 9. Health Services

#### Chapter 10. Department of Health Services – Health Care Institutions

#### Article 9. Outpatient Surgical Centers

February 2023

**1. Authorization of the rule by existing statutes:**

Authorizing statutes: A.R.S. §§ 36-132(A)(1), 36-132(A)(17), and 36-136(G)

Implementing statutes: A.R.S. §§ 36-405 and 36-406

**2. The objective of each rule:**

Rule	Objective
R9-10-901	To define terms used in the Article to enable the reader to understand clearly the requirements of the Article and allow for consistent interpretation.
R9-10-902	To establish minimum requirements for an outpatient surgical center's governing authority and administrator, including specific administrative policies and procedures to protect the health and safety of a patient.
R9-10-903	To establish minimum requirements for an outpatient surgical center's quality management program.
R9-10-904	To establish minimum requirements for outpatient surgical center services provided by a person who contracts with the licensee to provide outpatient surgical center services to ensure that the contractor complies with applicable requirements.
R9-10-905	To establish minimum standards for outpatient surgical center personnel.
R9-10-906	To establish minimum requirements for outpatient surgical center medical staff.
R9-10-907	To establish minimum requirements for an individual's admission to an outpatient surgical center.
R9-10-908	To establish minimum requirements for the transfer of a patient to ensure that the health and safety of the patient are not compromised as a result of the patient's transfer.
R9-10-909	To establish minimum standards for patient rights.
R9-10-910	To establish minimum requirements for patients' medical records.
R9-10-911	To establish minimum requirements for surgical services in an outpatient surgical center.
R9-10-912	To establish minimum requirements for nursing services in an outpatient surgical center.
R9-10-913	To establish minimum requirements for behavioral health services in an outpatient surgical center.
R9-10-914	To establish minimum requirements for medication services in an outpatient surgical center.
R9-10-915	To establish minimum requirements for infection control in an outpatient surgical center.
R9-10-916	To establish minimum requirements to ensure that an outpatient surgical center is prepared for an emergency.
R9-10-917	To establish minimum requirements for outpatient surgical center environmental services.

R9-10-918	To establish physical plant requirements for an outpatient surgical center's physical plant.
-----------	--

3. **Are the rules effective in achieving their objectives?** Yes  No

*If not, please identify the rule(s) that is not effective and provide an explanation for why the rule(s) is not effective.*

Rule	Explanation

4. **Are the rules consistent with other rules and statutes?** Yes  No

*If not, please identify the rule(s) that is not consistent. Also, provide an explanation and identify the provisions that are not consistent with the rule.*

Rule	Explanation
R9-10-902	The rule is consistent with other rules and statutes, but could be improved to comply with Laws 2022, Ch. 57, regarding outpatient surgical centers requirements to adopt and implement policies to prevent exposure to surgical smoke.
R9-10-911	The rule is consistent with other rules and statutes, but could be improved to comply with Laws 2021, Ch. 363, which amended A.R.S. 36-405, regarding the approved medical professional that can approve a patient's discharge from surgery, and the requirement of a medical professional to remain on the premise of the outpatient surgical center until all patients are discharged from the recovery room.

5. **Are the rules enforced as written?** Yes  No

*If not, please identify the rule(s) that is not enforced as written and provide an explanation of the issues with enforcement. In addition, include the agency's proposal for resolving the issue.*

Rule	Explanation

6. **Are the rules clear, concise, and understandable?** Yes  No

*If not, please identify the rule(s) that is not clear, concise, or understandable and provide an explanation as to how the agency plans to amend the rule(s) to improve clarity, conciseness, and understandability.*

Rule	Explanation

7. **Has the agency received written criticisms of the rules within the last five years?** Yes  No

*If yes, please fill out the table below:*

Commenter	Comment	Agency's Response

**8. Economic, small business, and consumer impact comparison (summary):**

Arizona Revised Statutes (A.R.S.) § 36-132(A)(1) requires the Arizona Department of Health Services (Department) to protect the health of the people of the state of Arizona. A.R.S. § 36-136(G) requires the Department to promulgate rules necessary for the proper administration and enforcement of the laws relating to public health. A.R.S. § 36-405(A) requires the Department to adopt rules setting minimum standards and requirements for the construction, modification, and licensing of health care institutions to protect the public health, safety, and welfare. Under A.R.S. § 36-405(B)(1), the Department classifies and sub-classifies health care institutions based on six statutory licensing criteria. A.R.S. § 36-406 requires the Department to enforce the provisions of A.R.S. Title 36, Chapter 4 and the rules adopted under that Chapter.

The Arizona Administrative Code (A.A.C.) Title 9, Chapter 10, Article 9 contains 18 rules that establish the requirements and minimum standards for outpatient surgical centers, implementing A.R.S. §§ 36-405 and 36-406. Laws 2011, Ch. 96, § 1, effective July 20, 2011, requires the Department to adopt rules for health care institutions to reduce monetary or regulatory costs on persons or individuals, and facilitate licensing of "integrated health programs that provide both behavioral and physical health services." The Department revised the rules in 9 A.A.C. 10 and 9 A.A.C. 20 to comply with Laws 2011, Ch. 96, § 1, during which the Department repealed outpatient surgical center rules in 9 A.A.C. 10, Article 17 and made new outpatient surgical center rules in 9 A.A.C. 10, Article 9 at 19 A.A.R. 2015, effective October 1, 2013. Additionally, the Article 9 rules were revised at 20 A.A.R. 1409, effective July 1, 2014, to further amend the rules, as allowed by Laws 2013, Ch. 10, § 13 that amended Laws 2011, Ch. 96 § 1 to extend the Department's time to revise the rules in 9 A.A.C. 10 and 9 A.A.C. 20 until April 30, 2014.

The rules in 9 A.A.C. 10, Article 9 were made new in their entirety in 2013 as part of an exempt rulemaking of 9 A.A.C. 10 and 9 A.A.C. 20 to comply with Laws 2011, Ch. 96. Additionally, in 2014, six of the rules in Article 9 were revised through exempt rulemaking to comply with Laws 2013, Ch. 10, effective July 1, 2014. No economic, small business, and consumer impact statements were prepared as a part of the exempt rulemakings. The Department believes persons who are directly affected by, bear the costs of, or directly benefit from the rules are: the Department, outpatient surgical centers, physicians and other health care providers, patients, and the general public. Annual costs and revenues are designated as minimal when more than \$0 and less than \$5,000, moderate when \$5,000 and less than \$20,000, and substantial when \$20,000 or greater. A cost or benefit is designated as significant when meaningful or important but not readily subject to quantification.

Currently, there are 271 licensed outpatient surgical center health care institutions in the state. In 2022, the Department received and approved 39 applications and 232 facilities paid annual licensing fees. Additionally, the Department completed 33 initial inspections, four compliant surveys, 85 compliance surveys, and 2

enforcement actions. The Department also collected \$1,500 in civil money penalties from licensees due to enforcement actions. The Department did not deny any applications or issue any revocations.

The rules in R9-10-917 were amended by expedited rulemaking at 25 A.A.R. 259, effective January 8, 2019. The rulemaking added a cross-reference to rules in 3 A.A.C. 8, Article 2 Department of Agriculture Pest Management, regarding the requirement that outpatient surgical centers must have a pest control program to ensure environmental standards are followed and in compliance with application requirements. The rules were last amended by expedited rulemaking found at 25 A.A.R. 3481, with an immediate effective date of November 5, 2019, regarding the rules in R9-10-918 for physical plant standards. The rules were amended to correct a cross reference to adhere to the requirements of physical plant standards at outpatient surgical centers.

After an analysis of 9 A.A.C. 10, Article 9 rules, the Department has determined that the rules are clear, concise and understandable. The Department does plan to amend the rules in Article 9 to adhere to the statutory changes to ensure that the rules are consistent with statute.

9. **Has the agency received any business competitiveness analyses of the rules?** Yes \_\_\_ No √

10. **Has the agency completed the course of action indicated in the agency's previous five-year-review report?**

*Please state what the previous course of action was and if the agency did not complete the action, please explain why not.*

The Department indicated that the rules in the last five-year-review-report were sufficient, and the rules were not amended pursuant to the 2018 five-year-review report.

11. **A determination that the probable benefits of the rule outweigh within this state the probable costs of the rule, and the rule imposes the least burden and costs to regulated persons by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective:**

The Department has determined that the rule imposes the least burden and costs to persons regulated by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

12. **Are the rules more stringent than corresponding federal laws?** Yes \_\_\_ No √

*Please provide a citation for the federal law(s). And if the rule(s) is more stringent, is there statutory authority to exceed the requirements of federal law(s)?*

The rules are not more stringent than federal laws.

13. **For rules adopted after July 29, 2010 that require the issuance of a regulatory permit, license, or agency authorization, whether the rules are in compliance with the general permit requirements of A.R.S. § 41-1037 or explain why the agency believes an exception applies:**

The rules require the issuance of a specific agency authorization, which is authorized by A.R.S. § 36-405, so a general permit is not applicable.

**14. Proposed course of action:**

*If possible, please identify a month and year by which the agency plans to complete the course of action.*

The Department plans to amend the rules in 9 A.A.C. 10, Article 9 as necessary to comply with the 2021 and 2022 statutory changes. The Department is actively engaging in the rulemaking processes to improve the rules with the described changes in this report. These changes will improve the effectiveness of the rules and the health and safety of patients receiving care at outpatient surgical centers. Therefore, the Department plans to submit a Notice of Final Rulemaking to the Governor's Regulatory Review Council by October 2023.

## ARTICLE 9. OUTPATIENT SURGICAL CENTERS

### R9-10-901. Definitions

In addition to the definitions in A.R.S. § 36-401 and R9-10-101, the following apply in this Article, unless otherwise specified:

1. "Inpatient care" means postsurgical services provided in a hospital.
2. "Outpatient surgical services" means anesthesia and surgical services provided to a patient in an outpatient surgical center.
3. "Surgical suite" means an area of an outpatient surgical center that includes one or more operating rooms and one or more recovery rooms.

### Historical Note

Adopted effective February 17, 1995 (Supp. 95-1). Amended by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Amended by final rulemaking at 9 A.A.R. 3792, effective October 4, 2003 (Supp. 03-3). Amended by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

### R9-10-902. Administration

A. A governing authority shall:

1. Consist of one or more individuals responsible for the organization, operation, and administration of an outpatient surgical center;
2. Establish, in writing:
  - a. An outpatient surgical center's scope of services, and
  - b. Qualifications for an administrator;
3. Designate, in writing, an administrator who has the qualifications established in subsection (A)(2)(b);
4. Grant, deny, suspend, or revoke clinical privileges of a physician and other members of the medical staff and delineate, in writing, the clinical privileges of each medical staff member, according to the medical staff bylaws;
5. Adopt a quality management plan according to R9-10-903;
6. Review and evaluate the effectiveness of the quality management plan at least once every 12 months;
7. Designate in writing, an acting administrator who has the qualifications established in subsection (A)(2)(b) if the administrator is:
  - a. Expected not to be present on an outpatient surgical center's premises for more than 30 calendar days, or
  - b. Not present on an outpatient surgical center's premises for more than 30 calendar days; and
8. Except as provided in subsection (A)(7), notify the Department according to A.R.S. § 36-425(I) when there is a change in the administrator and identify the name and qualifications of the new administrator.

B. An administrator:

1. Is directly accountable to the governing authority of an outpatient surgical center for the daily operation of the outpatient surgical center and for all services provided by or at the outpatient surgical center;
2. Has the authority and responsibility to manage the outpatient surgical center; and
3. Except as provided in subsection (A)(7), designates, in writing, an individual who is present on an outpatient surgical center's premises and accountable for the outpatient surgical center when the administrator is not present on the outpatient surgical center's premises.

C. An administrator shall ensure that:

1. Policies and procedures are established, documented, and implemented to protect the health and safety of a patient that:
  - a. Cover job descriptions, duties, and qualifications, including required skills, knowledge, education, and experience for personnel members, employees, volunteers, and students;
  - b. Cover orientation and in-service education for personnel members, employees, volunteers, and students;
  - c. Include how a personnel member may submit a complaint relating to patient care;
  - d. Cover the requirements in A.R.S. Title 36, Chapter 4, Article 11;
  - e. Include a method to identify a patient to ensure that the patient receives services as ordered;
  - f. Cover patient rights, including assisting a patient who does not speak English or who has a disability to become aware of patient rights;
  - g. Cover specific steps for:
    - i. A patient to file a complaint, and
    - ii. The outpatient surgical center to respond to a patient complaint;
  - h. Cover health care directives;
  - i. Cover medical records, including electronic medical records;
  - j. Cover a quality management program, including incident reports and supporting documentation; and
  - k. Cover contracted services;
2. Policies and procedures for medical services and nursing services provided by an outpatient surgical center are established, documented, and implemented to protect the health and safety of a patient that:
  - a. Cover patient screening, admission, transfer, and discharge;
  - b. Cover the provision of medical services, nursing services, and health-related services in the outpatient surgical center's scope of services;

- c. Include when general consent and informed consent are required;
  - d. Cover dispensing, administering, and disposing of medications;
  - e. Cover prescribing a controlled substance to minimize substance abuse by a patient;
  - f. Cover how personnel members will respond to a patient's sudden, intense, or out-of-control behavior to prevent harm to the patient or another individual;
  - g. Cover infection control; and
  - h. Cover environmental services that affect patient care;
3. Policies and procedures are:
    - a. Available to personnel members, employees, volunteers, and students of the outpatient surgical center; and
    - b. Reviewed at least once every three years and updated as needed;
  4. A pharmacy maintained by the outpatient surgical center is licensed according to A.R.S. Title 32, Chapter 18;
  5. Pathology services are provided by a laboratory that holds a certificate of accreditation, certificate of compliance, or certificate of waiver issued by the U.S. Department of Health and Human Services under the 1988 amendments to the Clinical Laboratories Act of 1967;
  6. If the outpatient surgical center meets the definition of "abortion clinic" in A.R.S. § 36-449.01, abortions and related services are provided in compliance with the requirements in Article 15 of this Chapter; and
  7. Unless otherwise stated:
    - a. Documentation required by this Article is provided to the Department within two hours after a Department request; and
    - b. When documentation or information is required by this Chapter to be submitted on behalf of an outpatient surgical center, the documentation or information is provided to the unit in the Department that is responsible for licensing and monitoring the outpatient surgical center.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-903. Quality Management**

An administrator shall ensure that:

1. A plan is established, documented, and implemented for an ongoing quality management program that, at a minimum, includes:
  - a. A method to identify, document, and evaluate incidents;
  - b. A method to collect data to evaluate services provided to patients;
  - c. A method to evaluate the data collected to identify a concern about the delivery of services related to patient care;
  - d. A method to make changes or take action as a result of the identification of a concern about the delivery of services related to patient care; and
  - e. The frequency of submitting a documented report required in subsection (2) to the governing authority;
2. A documented report is submitted to the governing authority that includes:
  - a. An identification of each concern about the delivery of services related to patient care, and
  - b. Any change made or action taken as a result of the identification of a concern about the delivery of services related to patient care; and
3. The report required in subsection (2) and the supporting documentation for the report are maintained for at least 12 months after the date the report is submitted to the governing authority.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-904. Contracted Services**

An administrator shall ensure that:

1. Contracted services are provided according to the requirements in this Article, and
2. Documentation of current contracted services is maintained that includes a description of the contracted services provided.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-905. Personnel**



- A.** An administrator shall ensure that:
1. The qualifications, skills, and knowledge required for each type of personnel member:
    - a. Are based on:
      - i. The type of physical health services or behavioral health services expected to be provided by the personnel member according to the established job description, and
      - ii. The acuity of the patients receiving physical health services or behavioral health services from the personnel member according to the established job description; and
    - b. Include:
      - i. The specific skills and knowledge necessary for the personnel member to provide the expected physical health services and behavioral health services listed in the established job description,
      - ii. The type and duration of education that may allow the personnel member to have acquired the specific skills and knowledge for the personnel member to provide the expected physical health services or behavioral health services listed in the established job description, and
      - iii. The type and duration of experience that may allow the personnel member to have acquired the specific skills and knowledge for the personnel member to provide the expected physical health services or behavioral health services listed in the established job description;
  2. A personnel member's skills and knowledge are verified and documented:
    - a. Before the personnel member provides physical health services or behavioral health services, and
    - b. According to policies and procedures;
  3. Sufficient personnel members are present on an outpatient surgical center's premises with the qualifications, skills, and knowledge necessary to:
    - a. Provide the services in the outpatient surgical center's scope of services,
    - b. Meet the needs of a patient, and
    - c. Ensure the health and safety of a patient;
  4. A personnel member, or an employee, a volunteer, or a student who has or is expected to have more than eight hours of direct interaction per week with patients, provides evidence of freedom from infectious tuberculosis:
    - a. On or before the date the individual begins providing services at or on behalf of the outpatient surgical center, and
    - b. As specified in R9-10-113;
  5. A plan to provide orientation, specific to the duties of a personnel member, an employee, a volunteer, and a student is developed, documented, and implemented;
  6. A personnel member completes orientation before providing physical health services or behavioral health services;
  7. An individual's orientation is documented, to include:
    - a. The individual's name,
    - b. The date of the orientation, and
    - c. The subject or topics covered in the orientation;
  8. A plan to provide in-service education specific to the job duties of a personnel member is developed, documented, and implemented; and
  9. A personnel member's in-service education is documented, to include:
    - a. The personnel member's name,
    - b. The date of the training, and
    - c. The subject or topics covered in the in-service education.
- B.** An administrator shall ensure that a personnel member:
1. Is 18 years of age or older; and
  2. Is certified in cardiopulmonary resuscitation within the first month of employment or volunteer service, and maintains current certification in cardiopulmonary resuscitation.
- C.** An administrator shall ensure that a personnel record for each personnel member, employee, volunteer, or student includes:
1. The individual's name, date of birth, and contact telephone number;
  2. The individual's starting date of employment or volunteer service and, if applicable, the ending date; and
  3. Documentation of:
    - a. The individual's qualifications, including skills and knowledge applicable to the individual's job duties;
    - b. The individual's education and experience applicable to the individual's job duties;
    - c. The individual's completed orientation and in-service education as required by policies and procedures;
    - d. The individual's license or certification, if the individual is required to be licensed or certified in this Article or policies and procedures;
    - e. If the individual is a behavioral health technician, clinical oversight required in R9-10-115;
    - f. Cardiopulmonary resuscitation training, if required for the individual according to subsection (B); and
    - g. Evidence of freedom from infectious tuberculosis, if required for the individual according to subsection (A)(4).
- D.** An administrator shall ensure that personnel records are:
1. Maintained:
    - a. Throughout the individual's period of providing services in or for the outpatient surgical center, and
    - b. For at least 24 months after the last date the individual provided services in or for the outpatient surgical center; and

2. For a personnel member who has not provided physical health services or behavioral health services at or for the outpatient surgical center during the previous 12 months, provided to the Department within 72 hours after the Department's request.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Amended by final rulemaking at 9 A.A.R. 3792, effective October 4, 2003 (Supp. 03-3). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-906. Medical Staff**

A governing authority shall ensure that:

1. The medical staff approve bylaws for the conduct of medical staff activities according to medical staff bylaws and governing authority requirements;
2. The medical staff physicians conduct medical peer review according to A.R.S. Title 36, Chapter 4, Article 5 and submit recommendations to the governing authority for approval; and
3. The medical staff establish written policies and procedures that define the extent of emergency treatment to be performed in the outpatient surgical center.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-907. Admission**

- A. A medical staff member shall only admit patients to the outpatient surgical center who:
  1. Do not require planned inpatient care, and
  2. Are discharged from the outpatient surgical center within 24 hours.
- B. Within 30 calendar days before a patient is admitted to an outpatient surgical center, a medical staff member shall complete a medical history and physical examination of the patient.
- C. The individual who is responsible for performing a patient's surgical procedure shall document the preoperative diagnosis and the surgical procedure to be performed in the patient's medical record.
- D. An administrator shall ensure that the following documents are in a patient's medical record before the patient's surgery:
  1. A medical history and the physical examination required in subsection (B),
  2. A preoperative diagnosis and the results of any laboratory tests or diagnostic procedures relative to the surgery and the condition of the patient,
  3. Evidence of informed consent by the patient or patient's representative for the surgical procedure and care of the patient,
  4. Health care directives, and
  5. Physician orders.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2).

**R9-10-908. Transfer**

Except for a transfer of a patient due to an emergency, an administrator shall ensure that:

1. A personnel member coordinates the transfer and the services provided to the patient;
2. According to policies and procedures:
  - a. An evaluation of the patient is conducted before the transfer;
  - b. Information in the patient's medical record, including orders that are in effect at the time of the transfer, is provided to a receiving health care institution; and
  - c. A personnel member explains risks and benefits of the transfer to the patient or the patient's representative; and
3. Documentation in the patient's medical record includes:
  - a. Communication with an individual at a receiving health care institution;
  - b. The date and time of the transfer;
  - c. The mode of transportation; and
  - d. If applicable, the name of the personnel member accompanying the patient during a transfer.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Amended by final rulemaking at 9 A.A.R. 3792, effective October 4, 2003 (Supp. 03-3). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013

(Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-909. Patient Rights**

- A.** An administrator shall ensure that:
1. The requirements in subsection (B) and the patient rights in subsection (C) are conspicuously posted on the premises;
  2. At the time of admission, a patient or the patient's representative receives a written copy of the requirements in subsection (B) and the patient rights in subsection (C); and
  3. Policies and procedures include:
    - a. How and when a patient or the patient's representative is informed of patient rights in subsection (C), and
    - b. Where patient rights are posted as required in subsection (A)(1).
- B.** An administrator shall ensure that:
1. A patient is treated with dignity, respect, and consideration;
  2. A patient is not subjected to:
    - a. Abuse;
    - b. Neglect;
    - c. Exploitation;
    - d. Coercion;
    - e. Manipulation;
    - f. Sexual abuse;
    - g. Sexual assault;
    - h. Seclusion;
    - i. Restraint;
    - j. Retaliation for submitting a complaint to the Department or another entity; or
    - k. Misappropriation of personal and private property by the outpatient surgical center's medical staff, personnel members, employees, volunteers, or students; and
  3. A patient or the patient's representative:
    - a. Except in an emergency, either consents to or refuses treatment;
    - b. May refuse or withdraw consent for treatment before treatment is initiated;
    - c. Except in an emergency, is informed of alternatives to a proposed psychotropic medication or surgical procedure and the associated risks and possible complications of the proposed psychotropic medication or surgical procedure;
    - d. Is informed of the following:
      - i. Policies and procedures on health care directives, and
      - ii. The patient complaint process;
    - e. Consents to photographs of the patient before a patient is photographed, except that a patient may be photographed when admitted to an outpatient surgical center for identification and administrative purposes; and
    - f. Except as otherwise permitted by law, provides written consent to the release of information in the patient's:
      - i. Medical record, or
      - ii. Financial records.
- C.** A patient has the following rights:
1. Not to be discriminated against based on race, national origin, religion, gender, sexual orientation, age, disability, marital status, or diagnosis;
  2. To receive treatment that supports and respects the patient's individuality, choices, strengths, and abilities;
  3. To receive privacy in treatment and care for personal needs;
  4. To review, upon written request, the patient's own medical record according to A.R.S. §§ 12-2293, 12-2294, and 12-2294.01;
  5. To receive a referral to another health care institution if the outpatient surgical center is not authorized or not able to provide physical health services needed by the patient;
  6. To participate, or have the patient's representative participate, in the development of or decisions concerning treatment;
  7. To participate or refuse to participate in research or experimental treatment; and
  8. To receive assistance from a family member, a patient's representative, or other individual in understanding, protecting, or exercising the patient's rights.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-910. Medical Records**

- A.** An administrator shall ensure that:
1. A medical record is established and maintained for a patient according to A.R.S. Title 12, Chapter 13, Article 7.1;
  2. An entry in a patient's medical record is:

- a. Recorded only by an individual authorized by policies and procedures to make the entry;
  - b. Dated, legible, and authenticated; and
  - c. Not changed to make the initial entry illegible;
3. An order is:
    - a. Dated when the order is entered in the patient's medical record and includes the time of the order;
    - b. Authenticated by a medical staff member according to policies and procedures; and
    - c. If the order is a verbal order, authenticated by the medical staff member issuing the order;
  4. If a rubber-stamp signature or an electronic signature is used to authenticate an order, the individual whose signature the rubber-stamp signature or electronic signature represents is accountable for the use of the rubber-stamp signature or electronic signature;
  5. A patient's medical record is available to an individual:
    - a. Authorized according to policies and procedures to access the patient's medical record;
    - b. If the individual is not authorized according to policies and procedures, with the written consent of the patient or the patient's representative; or
    - c. As permitted by law; and
  6. A patient's medical record is protected from loss, damage, or unauthorized use.
- B.** If an outpatient surgical center maintains patients' medical records electronically, an administrator shall ensure that:
1. Safeguards exist to prevent unauthorized access, and
  2. The date and time of an entry in a patient's medical record is recorded by the computer's internal clock.
- C.** An administrator shall ensure that a patient's medical record contains:
1. Patient information that includes:
    - a. The patient's name;
    - b. The patient's address;
    - c. The patient's date of birth; and
    - d. Any known allergies, including medication allergies;
  2. The admitting medical practitioner;
  3. An admitting diagnosis;
  4. Documentation of general consent and informed consent for treatment by the patient or the patient's representative, except in an emergency;
  5. If applicable, the name and contact information of the patient's representative and:
    - a. If the patient is 18 years of age or older or an emancipated minor, the document signed by the patient consenting for the patient's representative to act on the patient's behalf; or
    - b. If the patient's representative:
      - i. Has a health care power of attorney established under A.R.S. § 36-3221 or a mental health care power of attorney executed under A.R.S. § 36-3282, a copy of the health care power of attorney or mental health care power of attorney; or
      - ii. Is a legal guardian, a copy of the court order establishing guardianship;
  6. The date of admission and, if applicable, date of discharge;
  7. Documentation of medical history and results of a physical examination;
  8. A copy of patient's health care directive, if applicable;
  9. Orders;
  10. Progress notes;
  11. If applicable, documentation of any actions taken to control the patient's sudden, intense, or out-of-control behavior to prevent harm to the patient or another individual;
  12. Documentation of outpatient surgical center services provided to the patient;
  13. A discharge summary, if applicable;
  14. Documentation of receipt of written discharge instructions by the patient or patient's representative;
  15. If applicable:
    - a. Laboratory reports,
    - b. Radiologic report, and
    - c. Diagnostic reports;
  16. The anesthesia report, required in R9-10-911(C)(2);
  17. The operative report of the surgical procedure, required in R9-10-911(C)(1); and
  18. Documentation of a medication administered to the patient that includes:
    - a. The date and time of administration;
    - b. The name, strength, dosage, and route of administration;
    - c. For a medication administered for pain:
      - i. An assessment of the patient's pain before administering the medication, and
      - ii. The effect of the medication administered;
    - d. For a psychotropic medication:
      - i. An assessment of the patient's behavior before administering the psychotropic medication, and
      - ii. The effect of the psychotropic medication administered;

- e. The identification, signature, and professional designation of the individual administering or observing the self-administration of the medication; and
- f. Any adverse reaction a patient has to the medication.

**Historical Note**

Adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-911. Surgical Services**

- A.** An administrator shall ensure that:
1. A current listing of surgical procedures offered by an outpatient surgical center is maintained on the outpatient surgical center's premises, and
  2. A chronological register of surgical procedures performed in the outpatient surgical center is maintained for at least 24 months after the date of the last entry.
- B.** An administrator shall ensure that a roster of medical staff members who have clinical privileges at the outpatient surgical center is available to the medical staff, specifying the privileges and limitations of each medical staff member on the roster.
- C.** An administrator shall ensure that the individual responsible for:
1. Performing a surgical procedure completes an operative report of the surgical procedure and any necessary discharge instructions according to medical staff bylaws and policies and procedures, and
  2. Administering anesthesia during a surgical procedure completes an anesthesia report and any necessary discharge instructions according to medical staff bylaws and policies and procedures.
- D.** An administrator shall ensure that a physician remains on the outpatient surgical center's premises until all patients are discharged from the recovery room.

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-912. Nursing Services**

An administrator shall appoint a registered nurse as the director of nursing who:

1. Is responsible for the management of the outpatient surgical center's nursing services;
2. Ensures that policies and procedures are established, documented, and implemented for nursing services provided in the outpatient surgical center;
3. Ensures that the outpatient surgical center is staffed with sufficient nursing personnel, based on the number of patients, the health care needs of the patients, and the outpatient surgical center's scope of services;
4. Participates in quality management activities;
5. Designates a registered nurse, in writing, to manage an outpatient surgical center's nursing services when the director of nursing is not present on the outpatient surgical center's premises;
6. Ensures that a nurse who is not directly assisting the surgeon is responsible for the functioning of an operating room while a surgical procedure is being performed in the operating room;
7. Ensures that a registered nurse is present in the:
  - a. Recovery room when a patient is present in the recovery room, and
  - b. Outpatient surgical center until all patients are discharged; and
8. Ensures that a nurse documents in a patient's medical record that the patient or the patient's representative has received written discharge instructions.

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-913. Behavioral Health Services**

If an outpatient surgical center is authorized to provide behavioral health services, an administrator shall ensure that:

1. Policies and procedures are established, documented, and implemented that cover when informed consent is required and by whom informed consent may be given; and
2. The behavioral health services:
  - a. Are provided under the direction of a behavioral health professional; and
  - b. Comply with the requirements:

- i. For behavioral health paraprofessionals and behavioral health technicians, in R9-10-115; and
- ii. For an assessment, in R9-10-1011(B).

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-914. Medication Services**

- A.** An administrator shall ensure that policies and procedures for medication services:
  - 1. Include:
    - a. A process for providing information to a patient about medication prescribed for the patient including:
      - i. The prescribed medication's anticipated results,
      - ii. The prescribed medication's potential adverse reactions,
      - iii. The prescribed medication's potential side effects, and
      - iv. Potential adverse reactions that could result from not taking the medication as prescribed;
    - b. Procedures for preventing, responding to, and reporting:
      - i. A medication error,
      - ii. An adverse reaction to a medication, or
      - iii. A medication overdose; and
    - c. Procedures to ensure that a patient's medication regimen is reviewed by a medical practitioner to ensure the medication regimen meets the patient's needs; and
  - 2. Specify a process for review through the quality management program of:
    - a. A medication administration error, and
    - b. An adverse reaction to a medication.
- B.** An administrator shall ensure that:
  - 1. Policies and procedures for medication administration:
    - a. Are reviewed and approved by a medical practitioner;
    - b. Specify the individuals who may:
      - i. Order medication, and
      - ii. Administer medication;
    - c. Ensure that medication is administered to a patient only as prescribed; and
    - d. Cover the documentation of a patient's refusal to take prescribed medication in the patient's medical record;
  - 2. Verbal orders for medication services are taken by a nurse, unless otherwise provided by law; and
  - 3. A medication administered to a patient:
    - a. Is administered in compliance with an order, and
    - b. Is documented in the patient's medical record.
- C.** An administrator shall ensure that:
  - 1. A current drug reference guide is available for use by personnel members;
  - 2. A current toxicology reference guide is available for use by personnel members; and
  - 3. If pharmaceutical services are provided on the premises:
    - a. A committee, composed of at least one physician, one pharmacist, and other personnel members as determined by policies and procedures, is established to:
      - i. Develop a drug formulary,
      - ii. Update the drug formulary at least once every 12 months,
      - iii. Develop medication usage and medication substitution policies and procedures, and
      - iv. Specify which medications and medication classifications are required to be stopped automatically after a specific time period unless the ordering medical staff member specifically orders otherwise;
    - b. The pharmaceutical services are provided under the direction of a pharmacist;
    - c. The pharmaceutical services comply with A.R.S. Title 36, Chapter 27; A.R.S. Title 32, Chapter 18; and 4 A.A.C. 23; and
    - d. A copy of the pharmacy license is provided to the Department upon request.
- D.** When medication is stored at an outpatient surgical center, an administrator shall ensure that:
  - 1. Medication is stored in a separate locked room, closet, or self-contained unit used only for medication storage;
  - 2. Medication is stored according to the instructions on the medication container; and
  - 3. Policies and procedures are established, documented, and implemented for:
    - a. Receiving, storing, inventorying, tracking, dispensing, and discarding medication, including expired medication;
    - b. Discarding or returning prepackaged and sample medication to the manufacturer if the manufacturer requests the discard or return of the medication;
    - c. A medication recall and notification of patients who received recalled medication; and
    - d. Storing, inventorying, and dispensing controlled substances.

- E. An administrator shall ensure that a personnel member immediately reports a medication error or a patient's adverse reaction to a medication to the medical practitioner who ordered the medication and, if applicable, the outpatient surgical center's director of nursing.

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-915. Infection Control**

An administrator shall ensure that:

1. An infection control program is established, under the direction of an individual qualified according to policies and procedures, to prevent the development and transmission of infections and communicable diseases including:
  - a. A method to identify and document infections occurring at the outpatient surgical center;
  - b. Analysis of the types, causes, and spread of infections and communicable diseases at the outpatient surgical center;
  - c. The development of corrective measures to minimize or prevent the spread of infections and communicable diseases at the outpatient surgical center; and
  - d. Documenting infection control activities including:
    - i. The collection and analysis of infection control data,
    - ii. The actions taken related to infections and communicable diseases, and
    - iii. Reports of communicable diseases to the governing authority and state and county health departments;
2. Infection control documentation is maintained for at least 12 months after the date of the documentation;
3. Policies and procedures are established, documented, and implemented that cover:
  - a. Compliance with the requirements in 9 A.A.C. 6 for reporting and control measures for communicable diseases and infestations;
  - b. Handling and disposal of biohazardous medical waste;
  - c. Sterilization, disinfection, distribution, and storage of medical equipment and supplies;
  - d. Using personal protective equipment such as aprons, gloves, gowns, masks, or face protection when applicable;
  - e. Training personnel members, employees, and volunteers in infection control practices; and
  - f. Work restrictions for a personnel member with a communicable disease or infected skin lesion;
4. Biohazardous medical waste is identified, stored, and disposed of according to 18 A.A.C. 13, Article 14 and policies and procedures;
5. Soiled linen and clothing are:
  - a. Collected in a manner to minimize or prevent contamination,
  - b. Bagged at the site of use, and
  - c. Maintained separate from clean linen and clothing; and
6. A personnel member, employee, or volunteer washes hands or uses a hand disinfection product after patient contact and after handling soiled linen, soiled clothing, or potentially infectious material.

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

**R9-10-916. Emergency and Safety Standards**

- A. An administrator shall ensure that policies and procedures for providing medical emergency treatment to a patient are established, documented, and implemented and include:
1. A list of the medications, supplies, and equipment required on the premises for the medical emergency treatment provided by the outpatient surgical center;
  2. A system to ensure medications, supplies, and equipment are available, have not been tampered with, and, if applicable, have not expired;
  3. A requirement that a cart or a container is available for medical emergency treatment that contains medications, supplies, and equipment specified in policies and procedures;
  4. A method to verify and document that the contents of the cart or container are available for medical emergency treatment; and
  5. A method for ensuring a patient may be transferred to a hospital or other health care institution to receive treatment for a medical emergency that the outpatient surgical center is not authorized or not able to provide.
- B. An administrator shall ensure that medical emergency treatment is provided to a patient admitted to the outpatient surgical center according to policies and procedures.
- C. An administrator shall ensure that:

1. A disaster plan is developed, documented, maintained in a location accessible to medical staff and employees, and, if necessary, implemented that includes:
    - a. Procedures to be followed in the event of a fire or threat to patient safety;
    - b. Assigned personnel responsibilities;
    - c. Instructions for the evacuation or transfer of patients;
    - d. Maintenance of patient medical records; and
    - e. A plan to provide any other services related to patient care to meet the patients' needs;
  2. The disaster plan required in subsection (C)(1) is reviewed at least once every 12 months;
  3. Documentation of a disaster plan review required in subsection (C)(2) is created, is maintained for at least 12 months after the date of the disaster plan review, and includes:
    - a. The date and time of the disaster plan review;
    - b. The name of each personnel member, employee, medical staff member, or volunteer participating in the disaster plan review;
    - c. A critique of the disaster plan review; and
    - d. If applicable, recommendations for improvement;
  4. A disaster drill for employees is conducted on each shift at least once every three months and documented;
  5. An evacuation drill for employees is conducted at least once every six months for employees on the premises;
  6. Documentation of an evacuation drill is created, is maintained for at least 12 months after the date of the evacuation drill, and includes:
    - a. The date and time of the evacuation drill;
    - b. The amount of time taken for employees to evacuate the outpatient surgical center;
    - c. Any problems encountered in conducting the evacuation drill; and
    - d. Recommendations for improvement, if applicable; and
  7. An evacuation path is conspicuously posted on each hallway of each floor of the outpatient surgical center and every room where patients may be present.
- D.** An administrator shall ensure that, if applicable, a sign is placed at the entrance to a room or area indicating that oxygen is in use.
- E.** An administrator shall:
1. Obtain a fire inspection conducted according to the time-frame established by the local fire department or the State Fire Marshal,
  2. Make any repairs or corrections stated on the fire inspection report, and
  3. Maintain documentation of a current fire inspection.

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Section repealed, new Section adopted effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section amended by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2).

#### **R9-10-917. Environmental Standards**

- A.** An administrator shall ensure that:
1. An outpatient surgical center's premises and equipment are:
    - a. Cleaned and disinfected according to policies and procedures or manufacturer's instructions to prevent, minimize, and control illness or infection; and
    - b. Free from a condition or situation that may cause a patient or an individual to suffer physical injury;
  2. A pest control program that complies with A.A.C. R3-8-201(C)(4) is implemented and documented;
  3. Equipment used at the outpatient surgical center to provide care to a patient is:
    - a. Maintained in working order;
    - b. Tested and calibrated according to the manufacturer's recommendations or, if there are no manufacturer's recommendations, as specified in policies and procedures; and
    - c. Used according to the manufacturer's recommendations;
  4. Documentation of equipment testing, calibration, and repair is maintained for at least 12 months after the date of the testing, calibration, or repair;
  5. Garbage and refuse are:
    - a. Stored in covered containers lined with plastic bags, and
    - b. Removed from the premises at least once a week;
  6. Heating and cooling systems maintain the outpatient surgical center at a temperature between 70° F and 84° F at all times;
  7. Common areas:
    - a. Are lighted to assure the safety of patients, and
    - b. Have lighting sufficient to allow personnel members to monitor patient activity; and
  8. The supply of hot and cold water is sufficient to meet the personal hygiene needs of patients and the cleaning and sanitation requirements in this Article.
- B.** An administrator shall ensure that an outpatient surgical center has a functional emergency power source.



#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1). Section repealed; new Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2). Amended by final expedited rulemaking at 25 A.A.R. 259, effective January 8, 2019 (Supp. 19-1).

#### **R9-10-918. Physical Plant Standards**

- A.** An administrator shall ensure that the outpatient surgical center complies with the applicable physical plant health and safety codes and standards, incorporated by reference in R9-10-104.01, that were in effect on the date the outpatient surgical center submitted architectural plans and specifications to the Department for approval according to R9-10-104.
- B.** An administrator shall ensure that the premises and equipment are sufficient to accommodate:
  - 1. The services stated in the outpatient surgical center's scope of services, and
  - 2. An individual accepted as a patient by the outpatient surgical center.
- C.** An administrator shall ensure that:
  - 1. There are two recovery beds for each operating room, for up to four operating rooms, whenever general anesthesia is administered;
  - 2. One additional recovery bed is available for each additional operating room; and
  - 3. Recovery beds are located in a space that provides for a minimum of 70 square feet per bed, allowing three feet or more between beds and between the sides of a bed and the wall.
- D.** An administrator may provide chairs in the recovery room area that allow a patient to recline for patients who have not received general anesthesia.
- E.** An administrator shall ensure that the following are available in the surgical suite:
  - 1. Oxygen and the means of administration;
  - 2. Mechanical ventilator assistance equipment including airways, manual breathing bag, and suction apparatus;
  - 3. Cardiac monitor;
  - 4. Defibrillator; and
  - 5. Cardiopulmonary resuscitation drugs as determined by the policies and procedures.

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1). New Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed; new Section made by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2). Amended by exempt rulemaking at 20 A.A.R. 1409, pursuant to Laws 2013, Ch. 10, § 13; effective July 1, 2014 (Supp. 14-2). Amended by final expedited rulemaking, at 25 A.A.R. 3481 with an immediate effective date of November 5, 2019 (Supp. 19-4).

#### **R9-10-919. Repealed**

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1). New Section made by final rulemaking at 9 A.A.R. 338, effective March 16, 2003 (Supp. 03-1). Section repealed by exempt rulemaking at 19 A.A.R. 2015, effective October 1, 2013 (Supp. 13-2).

#### **R9-10-920. Repealed**

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

#### **R9-10-921. Repealed**

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

#### **R9-10-922. Repealed**

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

#### **R9-10-923. Repealed**

#### **Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

#### **R9-10-924. Repealed**

#### **Historical Note**

Adopted effective June 2, 1983 (Supp. 82-5). Former Section R9-10-924 repealed, new Section R9-10-924 adopted effective November 6, 1985 (Supp. 85-6). Repealed effective February 17, 1995 (Supp. 95-1).

**R9-10-925. Repealed**

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

**Attachment 1. Repealed**

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective February 17, 1995 (Supp. 95-1).

**Attachment 2. Repealed**

**Historical Note**

Adopted effective October 20, 1982 (Supp. 82-5). Repealed effective November 6, 1985 (Supp. 85-6).

Senate Engrossed House Bill

~~technical correction; game; fish; facilities~~  
~~(now: unemployment insurance study committee)~~  
(now: outpatient facilities; discharge; standards)

State of Arizona  
House of Representatives  
Fifty-fifth Legislature  
First Regular Session  
2021

**CHAPTER 363**  
**HOUSE BILL 2845**

AN ACT

AMENDING SECTION 36-405, ARIZONA REVISED STATUTES; RELATING TO HEALTH CARE INSTITUTIONS.

(TEXT OF BILL BEGINS ON NEXT PAGE)

1 Be it enacted by the Legislature of the State of Arizona:

2 Section 1. Section 36-405, Arizona Revised Statutes, is amended to  
3 read:

4 36-405. Powers and duties of the director

5 A. The director shall adopt rules to establish minimum standards  
6 and requirements for ~~the construction, modification~~ CONSTRUCTING,  
7 MODIFYING and ~~licensure of~~ LICENSING health care institutions necessary to  
8 ensure the public health, safety and welfare. The standards and  
9 requirements shall relate to the construction, equipment, sanitation,  
10 staffing for medical, nursing and personal care services, and  
11 recordkeeping pertaining to ~~the administration of~~ ADMINISTERING medical,  
12 nursing, behavioral health and personal care services, in accordance with  
13 generally accepted practices of health care. THE STANDARDS SHALL REQUIRE  
14 THAT A PHYSICIAN WHO IS LICENSED PURSUANT TO TITLE 32, CHAPTER 13 OR 17  
15 MEDICALLY DISCHARGE PATIENTS FROM SURGERY AND SHALL ALLOW AN OUTPATIENT  
16 SURGICAL CENTER TO REQUIRE THAT EITHER AN ANESTHESIA PROVIDER WHO IS  
17 LICENSED PURSUANT TO TITLE 32, CHAPTER 13, 15 OR 17 OR A PHYSICIAN WHO IS  
18 LICENSED PURSUANT TO TITLE 32, CHAPTER 13 OR 17 REMAIN PRESENT ON THE  
19 PREMISES UNTIL ALL PATIENTS ARE DISCHARGED FROM THE RECOVERY ROOM. EXCEPT  
20 AS OTHERWISE PROVIDED IN THIS SUBSECTION, the director shall use the  
21 current standards adopted by the joint commission on accreditation of  
22 hospitals and the commission on accreditation of the American osteopathic  
23 association or those adopted by any recognized accreditation organization  
24 approved by the department as guidelines in prescribing minimum standards  
25 and requirements under this section.

26 B. The director, by rule, may:

27 1. Classify and subclassify health care institutions according to  
28 character, size, range of services provided, medical or dental specialty  
29 offered, duration of care and standard of patient care required for the  
30 purposes of licensure. Classes of health care institutions may include  
31 hospitals, infirmaries, outpatient treatment centers, health screening  
32 services centers and residential care facilities. Whenever the director  
33 reasonably deems distinctions in rules and standards to be appropriate  
34 among different classes or subclasses of health care institutions, the  
35 director may make such distinctions.

36 2. Prescribe standards for determining a health care institution's  
37 substantial compliance with licensure requirements.

38 3. Prescribe the criteria for the licensure inspection process.

39 4. Prescribe standards for ~~the selection of~~ SELECTING health  
40 care-related demonstration projects.

41 5. Establish nonrefundable application and licensing fees for  
42 health care institutions, including a grace period and a fee for the late  
43 payment of licensing fees, and fees for architectural plans and  
44 specifications reviews.

- 1           6. Establish a process for the department to notify a licensee of  
2 the licensee's licensing fee due date.
- 3           7. Establish a process for a licensee to request a different  
4 licensing fee due date, including any limits on the number of requests by  
5 the licensee.
- 6           C. The director, by rule, shall adopt licensing provisions that  
7 facilitate the colocation and integration of outpatient treatment centers  
8 that provide medical, nursing and health-related services with behavioral  
9 health services consistent with article 3.1 of this chapter.
- 10          D. Ninety percent of the fees collected pursuant to this section  
11 shall be deposited, pursuant to sections 35-146 and 35-147, in the health  
12 services licensing fund established by section 36-414 and ten percent of  
13 the fees collected pursuant to this section shall be deposited, pursuant  
14 to sections 35-146 and 35-147, in the state general fund.
- 15          E. Subsection B, paragraph 5 of this section does not apply to a  
16 health care institution operated by a state agency pursuant to state or  
17 federal law or to adult foster care residential settings.

APPROVED BY THE GOVERNOR MAY 12, 2021.

FILED IN THE OFFICE OF THE SECRETARY OF STATE MAY 12, 2021.

House Engrossed

surgical smoke evacuation; requirements

State of Arizona  
House of Representatives  
Fifty-fifth Legislature  
Second Regular Session  
2022

## CHAPTER 57

# HOUSE BILL 2434

AN ACT

AMENDING TITLE 36, CHAPTER 4, ARTICLE 2, ARIZONA REVISED STATUTES, BY  
ADDING SECTION 36-434.01; RELATING TO HEALTH CARE INSTITUTIONS.

(TEXT OF BILL BEGINS ON NEXT PAGE)

1 Be it enacted by the Legislature of the State of Arizona:

2 Section 1. Title 36, chapter 4, article 2, Arizona Revised  
3 Statutes, is amended by adding section 36-434.01, to read:

4 36-434.01. Outpatient surgical centers; hospitals; surgical  
5 smoke evacuation systems; definitions

6 A. BEGINNING JULY 1, 2024, EACH OUTPATIENT SURGICAL CENTER OR  
7 HOSPITAL SHALL ADOPT AND IMPLEMENT POLICIES TO PREVENT EXPOSURE TO  
8 SURGICAL SMOKE BY USING A SMOKE EVACUATION SYSTEM FOR EACH PROCEDURE THAT  
9 GENERATES SURGICAL SMOKE.

10 B. THE DEPARTMENT SHALL ENSURE COMPLIANCE WITH THIS SECTION DURING  
11 ANY ONSITE INSPECTION AND IN RESPONSE TO ANY COMPLAINT RECEIVED RELATING  
12 TO A VIOLATION OF THIS SECTION.

13 C. FOR THE PURPOSES OF THIS SECTION:

14 1. "SMOKE EVACUATION SYSTEM" MEANS SMOKE EVACUATION EQUIPMENT AND  
15 TECHNOLOGIES DESIGNED TO CAPTURE, FILTER AND REMOVE SURGICAL SMOKE AT THE  
16 SITE OF ORIGIN AND TO PREVENT SURGICAL SMOKE FROM MAKING OCULAR CONTACT OR  
17 CONTACT WITH AN INDIVIDUAL'S RESPIRATORY TRACT.

18 2. "SURGICAL SMOKE":

19 (a) MEANS THE SURGICAL PLUME THAT IS GENERATED FROM THE USE OF AN  
20 ENERGY-GENERATING SURGICAL DEVICE.

21 (b) INCLUDES SMOKE PLUME, BIO-AEROSOLS, LASER-GENERATED AIRBORNE  
22 CONTAMINANTS AND LUNG-DAMAGING DUST.

APPROVED BY THE GOVERNOR MARCH 24, 2022.

FILED IN THE OFFICE OF THE SECRETARY OF STATE MARCH 24, 2022.

**DEPARTMENT OF HEALTH SERVICES**  
Title 9, Chapter 10, Articles 17





# GOVERNOR'S REGULATORY REVIEW COUNCIL

## ATTORNEY MEMORANDUM - FIVE-YEAR REVIEW REPORT

---

**MEETING DATE:** May 2, 2023

**TO:** Members of the Governor's Regulatory Review Council (Council)

**FROM:** Council Staff

**DATE:** April 14, 2023

**SUBJECT:** Department of Health Services  
Title 9, Chapter 10, Article 17

---

This Five-Year-Review Report (5YRR) from the Department of Health Services relates to rules in Title 9, Chapter 10, Article 17 regarding Unclassified Health Care Institutions.

The Department proposed to amend some of their rules in the last 5YRR, and completed the proposed course of action.

### **Proposed Action**

The Department is proposing to amend some of their rules in order to make them more clear, concise, understandable, and consistent with other rules and statutes. The Department indicates it plans to submit an Expedited Rulemaking to the Council by October 2023.

**1. Has the agency analyzed whether the rules are authorized by statute?**

Yes, the Department cites to both general and specific statutory authority.

**2. Summary of the agency's economic impact comparison and identification of stakeholders:**

The Department states that the rules in Article 17 contain unclassified health care institution rules that apply to any health care institution that is a class or subclass not otherwise classified in 9 Arizona Administrative Code (A.A.C.) 10 or any other health care institutions the Department determines are unclassified. The Department indicates that the rules were made new in their entirety in 2013 as part of an exempt rulemaking of 9 A.A.C. 10 and A.A.C. 20 to comply with Laws 2011, Ch. 96. The rules were last revised in 2019 and 2020 through expedited rulemaking. No economic, small business, and consumer impact statements were prepared as a part of the exempt rulemakings. The Department believes stakeholders to be the Department, unclassified health care institutions, patients and their families, and the general public.

The Department states there are currently 44 licensed unclassified health care institutions in the state providing palliative care, birthing services, and mobile imagery services. In 2022, the Department received and approved 8 applications.

The Department believes the changes made to the rules may have created a minimal increase in costs, but believes the benefit of having more effective and understandable rules outweigh any costs incurred. The Department estimates that the actual costs and benefits experienced by persons affected by the rules are generally consistent with the costs and benefits considered in developing the rules.

3. **Has the agency analyzed the costs and benefits of the rulemaking and determined that the rules impose the least burden and costs to those who are regulated?**

The Department has determined that the rules in 9 A.A.C. 10, Article 17 impose the least burden and costs to persons regulated by the rules, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

4. **Has the agency received any written criticisms of the rules over the last five years?**

No, the Department indicates they did not receive any written criticisms to the rules.

5. **Has the agency analyzed the rules' clarity, conciseness, and understandability?**

Yes, the Department indicates the rules are overall clear, concise, understandable with the exception of the following:

**R9-10-1704** - Contracted Services

**R9-10-1705** - Personnel

**R9-10-1706** - Transport; Transfer

**R9-10-1709** - Medication Services

6. **Has the agency analyzed the rules' consistency with other rules and statutes?**

Yes, the Department indicates the rules are consistent with other rules and statutes with the exception of the following:

**R9-10-1702 - Administration**

**7. Has the agency analyzed the rules' effectiveness in achieving its objectives?**

Yes, the Department indicates the rules are effective in achieving their objectives.

**8. Has the agency analyzed the current enforcement status of the rules?**

Yes, the Department indicates the rules are enforced as written.

**9. Are the rules more stringent than corresponding federal law and, if so, is there statutory authority to exceed the requirements of federal law?**

Not applicable. There are no corresponding federal laws.

**10. For rules adopted after July 29, 2010, do the rules require a permit or license and, if so, does the agency comply with A.R.S. § 41-1037?**

The rules do not require the issuance of a general permit. The rules require the issuance of a specific agency authorization, which is authorized by A.R.S. 36-405.

**11. Conclusion**

As mentioned above, the Department is proposing to amend several of its rules in order to make them more clear, concise, understandable, and consistent with the other rules and statutes. The Department plans to submit an Expedited Rulemaking to the Council by October 2023.

Council staff recommends approval of this report.



# ARIZONA DEPARTMENT OF HEALTH SERVICES

February 21, 2023

**VIA EMAIL: [grrc@azdoa.gov](mailto:grrc@azdoa.gov)**

Nicole Sornsin, Esq., Chair  
Governor's Regulatory Review Council  
Arizona Department of Administration  
100 N. 15th Avenue, Suite 305  
Phoenix, AZ 85007

RE: Department of Health Services, 9 A.A.C. 10, Article 17, Five-Year-Review Report for Health Care Institutions: Licensing – Unclassified Health Care Institutions

Dear Ms. Sornsin:

Please find enclosed the Five-Year Review Report (Report) from the Arizona Department of Health Services (Department) for 9 A.A.C. 10, Article 17, Unclassified Health Care Institutions, which is due on February 28, 2023.

The Department reviewed the rules in 9 A.A.C. 10, Article 17, with the intention that the rules do not expire pursuant to A.R.S. § 41-1056(J).

The Department hereby certifies compliance with A.R.S. § 41-1091.

For questions about this report, please contact me at (602) 542-1020.

Sincerely,

A handwritten signature in black ink, appearing to read "Stacie Gravito".

Stacie Gravito  
Director's Designee

SG:lf

Enclosures

Katie Hobbs | Governor

Jennifer Cunico | Acting Director



**Arizona Department of Health Services**

**Five-Year-Review Report**

**Title 9. Health Services**

**Chapter 10. Department of Health Services -**

**Health Care Institutions: Licensing**

**Article 17. Unclassified Health Care Institutions**

**February 2023**

**1. Authorization of the rule by existing statutes**

General Statutory Authority: A.R.S. §§ 36-132(A)(1), 36-132(A)(17), and 36-136(G)

Specific Statutory Authority: A.R.S. §§ 36-405 and 36-406

**2. The objective of each rule:**

<b>Rule</b>	<b>Objective</b>
R9-10-1701	To define terms used in the Article to enable the reader to understand clearly the requirements of the Article and allow for consistent interpretation.
R9-10-1702	To establish minimum requirements for an unclassified health care institution's governing authority and administrator, including specific administrative policies and procedures to protect the health and safety of a patient.
R9-10-1703	To establish minimum requirements for an unclassified health care institution's quality management program.
R9-10-1704	To establish minimum requirements for unclassified health care institution services provided by a person who contracts with the licensee to provide outpatient surgical center services to ensure that the contractor complies with applicable requirements.
R9-10-1705	To establish minimum standards for unclassified health care institution personnel.
R9-10-1706	To establish minimum requirements for the transfer of a patient to ensure that the health and safety of the patient are not compromised as a result of the patient's transfer.
R9-10-1707	To establish minimum standards for patient rights.
R9-10-1708	To establish minimum requirements for patients' medical records.
R9-10-1709	To establish minimum requirements for medication services in an unclassified health care institution.
R9-10-1710	To establish minimum requirements for an unclassified health care institution that provides food services to handle and maintain foods free from contamination; serve foods that meet a patient's dietary needs; and serve patients balanced-nutritional meals and snacks.
R9-10-1711	To establish minimum requirements to ensure that an unclassified health care institution is prepared for an emergency, and for an unclassified health care institution that keeps a firearm or ammunition, minimum requirements for storing the firearm and ammunition.
R9-10-1712	To establish minimum requirements to ensure that a building is safe and designated living areas are accessible and adequate to accommodate patients, providers, and other individuals present in an unclassified health care institution. The objectives of the rules also establish requirements to maintain the health care institution's premises clean, disinfected, and free from hazardous conditions; and equipment periodically inspected, tested, calibrated, serviced, or repaired so equipment functions properly and reliably.

3. **Are the rules effective in achieving their objectives?** Yes  No

*If not, please identify the rule(s) that is not effective and provide an explanation for why the rule(s) is not effective.*

Rule	Explanation

4. **Are the rules consistent with other rules and statutes?** Yes  No

*If not, please identify the rule(s) that is not consistent. Also, provide an explanation and identify the provisions that are not consistent with the rule.*

Rule	Explanation
R9-10-1702	Laws 2021, Ch. 320, which amended A.R.S. § 36-3601, changed the term "telemedicine" to "telehealth." To align with the updated statutory language, the term "telemedicine" in the rule should be changed to "telehealth."

5. **Are the rules enforced as written?** Yes  No

*If not, please identify the rule(s) that is not enforced as written and provide an explanation of the issues with enforcement. In addition, include the agency's proposal for resolving the issue.*

Rule	Explanation

6. **Are the rules clear, concise, and understandable?** Yes  No

*If not, please identify the rule(s) that is not clear, concise, or understandable and provide an explanation as to how the agency plans to amend the rule(s) to improve clarity, conciseness, and understandability.*

Rule	Explanation
R9-10-1704	The rule is clear, concise, and understandable, but could be improved in subsection (2) by correcting the word "documented" to "documentation."
R9-10-1705	The rule is clear, concise, and understandable, but could be improved in subsection (D) by removing the extraneous "or."
R9-10-1705	The rule is clear, concise, and understandable, but could be improved in subsection (E)(3)(3) by correcting the word "serves" to "services."
R9-10-1706	The rule is clear, concise, and understandable, but could be improved in subsection (C)(2)(c) by adding in a proper article, "the."
R9-10-1709	The rule is clear, concise, and understandable, but could be improved by simplifying and removing duplicative the language in subsection (A)(1)(a).

R9-10-1712	The rule is clear, concise, and understandable, but could be improved in subsection (A)(4)(a) by correcting the word “each” to “every.”
------------	---

7. **Has the agency received written criticisms of the rules within the last five years?** Yes  No

*If yes, please fill out the table below:*

Rule	Explanation

8. **Economic, small business, and consumer impact comparison:**

Arizona Revised Statutes (A.R.S.) § 36-132(A)(1) requires the Arizona Department of Health Services (Department) to protect the health of the people of the state of Arizona. A.R.S. § 36-136(G) requires the Department to promulgate rules necessary for the proper administration and enforcement of the laws relating to public health. A.R.S. § 36-405(A) requires the Department to adopt rules setting minimum standards and requirements for the construction, modification, and licensing of health care institutions to protect the public health, safety, and welfare, and A.R.S. § 36-405(B)(1) requires the Department to classify and sub-classify health care institutions. Additionally, A.R.S. § 36-406 requires the Department to enforce the provisions of A.R.S. Title 36, Chapter 4, and the rules adopted under that Chapter.

The Department promulgated Arizona Administrative Code (A.A.C.) R9-10-115 in 1981, providing rules for unclassified health care institutions and implementing A.R.S. §§ 36-405 and 36-406. Laws 2011, Ch. 96, § 1, effective July 20, 2011, required the Department to adopt rules for health care institutions that reduce monetary or regulatory costs on a person and facilitate licensing of "integrated health programs that provide both behavioral and physical health services." The Department revised the rules in 9 A.A.C. 10 and 9 A.A.C. 20 to comply with Laws 2011, Ch. 96, § 1, during which the Department repealed the rules for unclassified health care institutions in 9 A.A.C. 10, Article 1 and promulgated the new unclassified health care institutions rules in 9 A.A.C. 10, Article 17 at 19 A.A.R. 2015, effective October 1, 2013. 9 A.A.C. 10, Article 17 contains unclassified health care institution rules that apply to any health care institution that is a class or subclass not otherwise classified in 9 A.A.C. 10 or any other health care institution the Department determines is unclassified. The rules integrate physical health and behavioral health services provided to patients and consist of requirements for administration, quality management, personnel qualifications, patient rights, patient medical records, and patient transport and transfer. In addition, the rules contain requirements for contract services, medication services, and food services, and standards for emergency and safety, physical plant, environmental controls, and equipment.

The rules in 9 A.A.C. 10, Article 17 were made new in their entirety in 2013 as part of an exempt rulemaking of 9 A.A.C. 10 and 9 A.A.C. 20 to comply with Laws 2011, Ch. 96. The rules were last revised in 2019, through expedited rulemaking at 25 A.A.R. 259, effective January 8, 2019; and again in 2020 by expedited rulemaking at 26 A.A.R. 3041, effective November 3, 2020. No economic, small business, and consumer impact statements were prepared as a part of the exempt and expedited rulemakings. The Department believes persons

who are directly affected by, bear the costs of, or directly benefit from the rules include the Department, unclassified health care institutions, patients and their families, and the general public. Annual costs and revenues are designated as minimal when more than \$0 and less than \$5,000, moderate when \$5,000 and less than \$20,000, and substantial when \$20,000 or greater. A cost or benefit is designated as significant when meaningful or important but not readily subject to quantification.

Unclassified health care institutions provide medical services, nursing services, personal care services, palliative services, and other health-related services. Currently, there are 44 licensed unclassified health care institutions in the state with most providing palliative care, birthing services, and mobile imagery services. In 2022, the Department received and approved 8 applications. Additionally, the Department completed eight initial surveys, three compliant surveys, 15 renewal surveys, and seven enforcement actions. The Department also collected \$250 in civil money penalties from licensees due to enforcement actions. The Department did not deny any applications or issue any revocations.

In the 2019 expedited rulemaking at 25 A.A.R. 259, R9-10-1712 was amended to add a cross-reference for a pest control program that complies with A.A.C. R3-8-201(C)(4). This change in the rule provided better clarity to those affected by the rules as to what pest control program is appropriate, in addition to making the rules in Article 17 more consistent with Chapter 10. The 2020 expedited rulemaking at 26 A.A.R. 304 amended R9-10-1705 to implement Laws 2019, Ch. 215, § 4. Laws 2019, Ch. 215, § 4 requires the Department to allow “a person who is employed at a health care institution that provides behavioral health services, who is not a licensed behavioral health professional and who is at least eighteen years of age to provide behavioral health or other related health care services pursuant to all applicable department rules.” The Department believes that all persons affected by the rules including unclassified health care institutions and patients have received a significant benefit from having rules that comply with the statutory requirements for pest control programs, as well as ensuring a behavioral health professional is at least 18 years old.

Overall, the Department believes that the changes made to the rules may have created a minimal increase in costs, but believes that the benefit of having more effective and understandable rules outweighs any costs incurred. On the basis of the information described above, the Department estimates that the actual costs and benefits experienced by persons affected by the rules are generally consistent with the costs and benefits considered in developing the rules.

9. **Has the agency received any business competitiveness analyses of the rules?** Yes \_\_\_ No X

10. **Has the agency completed the course of action indicated in the agency’s previous five-year-review report?**

*Please state what the previous course of action was and if the agency did not complete the action, please explain why not.*

The Department completed the action specified in the previous 5YRR.



11. **A determination that the probable benefits of the rule outweigh within this state the probable costs of the rule, and the rule imposes the least burden and costs to regulated persons by the rule, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective:**

The Department has determined that the rules in 9 A.A.C. 10, Article 17 impose the least burden and costs to persons regulated by the rules, including paperwork and other compliance costs, necessary to achieve the underlying regulatory objective.

12. **Are the rules more stringent than corresponding federal laws?** Yes \_\_\_ No X

*Please provide a citation for the federal law(s). And if the rule(s) is more stringent, is there statutory authority to exceed the requirements of federal law(s)?*

Federal laws do not apply to the rules in 9 A.A.C. 10, Article 17.

13. **For rules adopted after July 29, 2010 that require the issuance of a regulatory permit, license, or agency authorization, whether the rules are in compliance with the general permit requirements of A.R.S. § 41-1037 or explain why the agency believes an exception applies:**

A general permit is not applicable. The rules require the issuance of a specific agency authorization, which is authorized by A.R.S. § 36-405.

14. **Proposed course of action**

*If possible, please identify a month and year by which the agency plans to complete the course of action.*

The Department in its review of Article 17 has determined that the rules are effective. In this five-year-review report, the Department identifies no substantive matters that prevent the rules from being effective and enforceable, however, the Department intends to complete an expedited rulemaking by October 2023 to amend the rules to address the issues as described in this report.

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

## TITLE 9. HEALTH SERVICES

CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS:  
LICENSING

## ARTICLE 17. UNCLASSIFIED HEALTH CARE INSTITUTIONS

**R9-10-1701. Definitions**

Definitions in A.R.S. § 36-401 and R9-10-101 apply in this Article unless otherwise specified.

**R9-10-1702. Administration**

- A.** A governing authority for a health care institution not otherwise classified or subclassified in A.R.S. Title 36, Chapter 4 or 9 A.A.C. 10 shall:
1. Consist of one or more individuals responsible for the organization, operation, and administration of the health care institution;
  2. Establish, in writing:
    - a. A health care institution's scope of services, and
    - b. Qualifications for an administrator;
  3. Designate, in writing, an administrator who has the qualifications established in subsection (A)(2)(b);
  4. Adopt a quality management program according to R9-10-1703;
  5. Review and evaluate the effectiveness of the quality management program in R9-10-1703 at least once every 12 months;
  6. Designate, in writing, an acting administrator who has the qualifications established in subsection (A)(2)(b) if the administrator is:
    - a. Expected not to be present on a health care institution's premises for more than 30 calendar days, or
    - b. Not present on a health care institution's premises for more than 30 calendar days; and
  7. Except as provided in subsection (A)(6), notify the Department according to A.R.S. § 36-425 when there is a change in an administrator and identify the name and qualifications of the new administrator.
- B.** An administrator:
1. Is directly accountable to the governing authority of a health care institution for the daily operation of the health care institution and all services provided by or at the health care institution;
  2. Has the authority and responsibility to manage the health care institution; and
  3. Except as provided in subsection (A)(6), designates, in writing, an individual who is present on the health care institution's premises and accountable for the health care institution when the administrator is not present on the health care institution's premises.
- C.** An administrator shall ensure that:
1. Policies and procedures are established, documented, and implemented to protect the health and safety of a patient that:
    - a. Cover job descriptions, duties, and qualifications, including required skills, knowledge, education, and experience for personnel members, employees, volunteers and students;
    - b. Cover orientation and in-service education for personnel members, employees, volunteers and students;
    - c. Include how a personnel member may submit a complaint relating to services provided to a patient;
    - d. Cover the requirements in A.R.S. Title 36, Chapter 4, Article 11;
    - e. Cover cardiopulmonary resuscitation training, including:
      - i. The method and content of cardiopulmonary resuscitation training,
      - ii. The qualifications for an individual providing cardiopulmonary resuscitation training,
      - iii. The time-frame for renewal of cardiopulmonary resuscitation training, and
      - iv. The documentation that verifies that the individual has received cardiopulmonary resuscitation training;
    - f. Include a method to identify a patient to ensure the patient receives services as ordered;
    - g. Cover first aid training;
    - h. Cover patient rights, including assisting a patient who does not speak English or who has a physical or other disability to become aware of patient rights;
    - i. Cover specific steps for:
      - i. A patient to file a complaint, and
      - ii. The health care institution to respond to and resolve a patient complaint;
    - j. Cover medical records, including electronic medical records;
    - k. Cover a quality management program, including incident report and supporting documentation;

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- l. Cover contracted services;
- m. Cover health care directives; and
- n. Cover when an individual may visit a patient in a health care institution;
2. Policies and procedures for health care institution services are established, documented, and implemented to protect the health and safety of a patient that:
  - a. Cover patient screening, admission, assessment, treatment plan, transport, transfer, and discharge, if applicable;
  - b. Cover patient outings, if applicable;
  - c. Include when general consent and informed consent are required;
  - d. Cover the provision of services listed in the health care institution's scope of services;
  - e. Cover administering medication, assistance in the self-administration of medication, and disposing of medication, including provisions for inventory control and preventing diversion of controlled substances, if applicable;
  - f. Cover infection control;
  - g. Cover telemedicine, if applicable;
  - h. Cover environmental services that affect patient care;
  - i. Cover smoking and the use of tobacco products on the health care institution's premises;
  - j. Cover how the health care institution will respond to a patient's sudden, intense, or out-of-control behavior to prevent harm to the patient or another individual;
  - k. Cover how incidents are reported and investigated; and
  - l. Designate which employees or personnel members are required to have current certification in cardiopulmonary resuscitation and first aid training;
3. Policies and procedures are reviewed at least once every three years and updated as needed;
4. Policies and procedures are available to personnel members, employees, volunteers, and students; and
5. Unless otherwise stated:
  - a. Documentation required by this Article is provided to the Department within two hours after the Department's request; and
  - b. When documentation or information is required by this Chapter to be submitted on behalf of a health care institution, the documentation or information is provided to the unit in the Department that is responsible for licensing and monitoring the health care institution.
- D.** If applicable, an administrator shall designate a clinical director who:
  1. Provides direction for behavioral health services provided at the health care institution, and
  2. Is a behavioral health professional.
- E.** An administrator shall provide written notification to the Department of a patient's:
  1. Death, if the patient's death is required to be reported according to A.R.S. § 11-593, within one working day after the patient's death; and
  2. Self-injury, within two working days after the patient inflicts a self-injury that requires immediate intervention by an emergency medical services provider.
- F.** If abuse, neglect, or exploitation of a patient is alleged or suspected to have occurred before the patient was admitted or while the patient is not on the premises and not receiving services from a health care institution's employee or personnel member, an administrator shall report the alleged or suspected abuse, neglect, or exploitation of the patient as follows:
  1. For a patient 18 years of age or older, according to A.R.S. § 46-454; or
  2. For a patient under 18 years of age, according to A.R.S. § 13-3620.
- G.** If an administrator has a reasonable basis, according to A.R.S. § 13-3620 or 46-454, to believe abuse, neglect, or exploitation has occurred on the premises or while the patient is receiving unclassified healthcare services, the administrator shall:
  1. If applicable, take immediate action to stop the suspected abuse, neglect, or exploitation;
  2. Report the suspected abuse, neglect, or exploitation of the patient:
    - a. For a patient 18 years of age or older, according to A.R.S. § 46-454; or
    - b. For a patient under 18 years of age, according to A.R.S. § 13-3620;
  3. Document:
    - a. The suspected abuse, neglect, or exploitation;
    - b. Any action taken according to subsection (G)(1); and
    - c. The report in subsection (G)(2);
  4. Maintain the documentation in subsection (G)(3) for at least 12 months after the date of the report in subsection (G)(2);
  5. Initiate an investigation of the suspected abuse, neglect, or exploitation and document the following information within five working days after the report required in (G)(2):
    - a. The dates, times, and description of the suspected abuse, neglect, or exploitation;

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- b. A description of any injury to the patient related to the suspected abuse or neglect and any change to the patient's physical, cognitive, functional, or emotional condition;
  - c. The names of witnesses to the suspected abuse, neglect, or exploitation; and
  - d. The action taken by the administrator to prevent the suspected abuse, neglect, or exploitation from occurring in the future; and
6. Maintain a copy of the documented information required in subsection (G)(5) and any other information obtained during the investigation for at least 12 months after the date the investigation was initiated.
- H.** An administrator shall ensure that the following information or documents are conspicuously posted on the premises and are available upon request to a personnel member, an employee, a patient, or a patient's representative:
1. The health care institution's current license,
  2. The evacuation plan listed in R9-10-1711, and
  3. The location at which inspection reports required in R9-10-1711(B) are available for review or can be made available for review.

**R9-10-1703. Quality Management**

An administrator shall ensure that:

1. A plan is established, documented, and implemented for an ongoing quality management program that, at a minimum, includes:
  - a. A method to identify, document, and evaluate incidents;
  - b. A method to collect data to evaluate services provided to patients;
  - c. A method to evaluate the data collected to identify a concern about the delivery of services related to patient care;
  - d. A method to make changes or take action as a result of the identification of a concern about the delivery of services related to patient care; and
  - e. The frequency of submitting a documented report required in subsection (2) to the governing authority;
2. A documented report is submitted to the governing authority that includes:
  - a. An identification of each concern about the delivery of services related to patient care, and
  - b. Any changes made or actions taken as a result of the identification of a concern about the delivery of services related to patient care; and
3. The report required in subsection (2) and the supporting documentation for the report are maintained for at least 12 months after the date the report is submitted to the governing authority.

**R9-10-1704. Contracted Services**

An administrator shall ensure that:

1. Contracted services are provided according to the requirements in this Article,
2. Documented of current contracted services is maintained that includes a description of the contracted services provided.

**R9-10-1705. Personnel**

**A.** An administrator shall ensure that:

1. A personnel member is:
  - a. At least 21 years old, or
  - b. If providing behavioral health services, at least 18 years old;
2. An employee is at least 18 years old;
3. A student is at least 18 years old; and
4. A volunteer is at least 21 years old.

**B.** An administrator shall ensure that:

1. The qualifications, skills, and knowledge required for each type of personnel member:
  - a. Are based on:
    - i. The type of behavioral health services or physical health services expected to be provided by the personnel member according to the established job description, and
    - ii. The acuity of participants receiving behavioral health services or physical health services from the personnel member according to the established job description;
  - b. Include:
    - i. The specific skills and knowledge necessary for the personnel member to provide the expected physical health services and behavioral health services listed in the established job description,

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- ii. The type and duration of education that may allow the personnel member to have acquired the specific skills and knowledge for the personnel member to provide the expected physical health services or behavioral health services listed in the established job description, and
    - iii. The type and duration of experience that may allow the personnel member to have acquired the specific skills and knowledge for the personnel member to provide the expected physical health services or behavioral health services listed in the established job description;
  2. A personnel member's skills and knowledge are verified and documented:
    - a. Before the personnel member provides physical health services or behavioral health services, and
    - b. According to policies and procedures;
  3. Sufficient personnel members are present on a health care institution's premises with the qualifications, skills, and knowledge necessary to:
    - a. Provide the services in the health care institution's scope of services,
    - b. Meet the needs of a patient, and
    - c. Ensure the health and safety of a patient.
- C. An administrator shall ensure that:
  1. A plan to provide orientation specific to the duties of a personnel member, employee, volunteer, and student is developed, documented, and implemented;
  2. A personnel member completes orientation before providing behavioral health services or physical health services;
  3. An individual's orientation is documented, to include:
    - a. The individual's name,
    - b. The date of the orientation, and
    - c. The subject or topics covered in the orientation;
  4. A plan to provide in-service education specific to the duties of a personnel member is developed;
  5. A personnel member's in-service education is documented, to include:
    - a. The personnel member's name,
    - b. The date of the training, and
    - c. The subject or topics covered in the training; and
  6. A work schedule of each personnel member is developed and maintained at the health care institution for at least 12 months after the date of the work schedule.
- D. An administrator shall ensure that a personnel member, or an employee, a volunteer, or a student who has or is expected to have direct interaction with a patient, provides evidence of freedom from infectious tuberculosis:
  - a. On or before the date the individual begins providing services at or on behalf of the unclassified healthcare institution, and
  - b. As specified in R9-10-113.
- E. An administrator shall ensure that a personnel record is maintained for each personnel member, employee, volunteer, or student that includes:
  1. The individual's name, date of birth, and contact telephone number;
  2. The individual's starting date of employment or volunteer service and, if applicable, the ending date; and
  3. Documentation of:
    - a. The individual's qualifications including skills and knowledge applicable to the individual's job duties;
    - b. The individual's education and experience applicable to the individual's job duties;
    - c. The individual's completed orientation and in-service education as required by policies and procedures;
    - d. The individual's license or certification, if the individual is required to be licensed or certified in this Article or policies and procedures;
    - e. If the health care institution provides services to children, the individual's compliance with the fingerprinting requirements in A.R.S. § 36-425.03;
    - f. Cardiopulmonary resuscitation training, if required for the individual according to R9-10-1702(C)(2)(1);
    - g. First aid training, if required for the individual according to this Article or policies and procedures; and
    - h. Evidence of freedom from infectious tuberculosis, if the individual is required to provide evidence of freedom according to subsection (D).
- F. An administrator shall ensure that personnel records are:
  1. Maintained:
    - a. Throughout an individual's period of providing services in or for the health care institution, and
    - b. For at least 24 months after the last date the individual provided services in or for the health care institution; and

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

2. For a personnel member who has not provided physical health services or behavioral health services at or for the health care institution during the previous 12 months, provided to the Department within 72 hours after the Department's request.
- G.** An administrator shall ensure that at least one personnel member who is present at the health care institution during the hours of the health care institution operation has first-aid training and cardiopulmonary resuscitation certification specific to the populations served by the health care institution.

**R9-10-1706. Transport; Transfer**

- A.** Except as provided in subsection (B), an administrator shall ensure that:
1. A personnel member coordinates the transport and the services provided to the patient;
  2. According to policies and procedures:
    - a. An evaluation of the patient is conducted before and after the transport,
    - b. Information in the patient's medical record is provided to a receiving health care institution, and
    - c. A personnel member explains risks and benefits of the transport to the patient or the patient's representative; and
  3. Documentation in the patient's medical record includes:
    - a. Communication with an individual at a receiving health care institution;
    - b. The date and time of the transport;
    - c. The mode of transportation; and
    - d. If applicable, the personnel member accompanying the patient during a transport.
- B.** Subsection (A) does not apply to:
1. Transportation to a location other than a licensed health care institution,
  2. Transportation provided for a patient by the patient or the patient's representative,
  3. Transportation provided by an outside entity that was arranged for a patient by the patient or the patient's representative, or
  4. A transport to another licensed health care institution in an emergency.
- C.** Except for a transfer of a patient due to an emergency, an administrator shall ensure that:
1. A personnel member coordinates the transfer and the services provided to the patient;
  2. According to policies and procedures:
    - a. An evaluation of the patient is conducted before the transfer;
    - b. Information in the patient's medical record, including orders that are in effect at the time of the transfer, is provided to a receiving health care institution; and
    - c. A personnel member explains risks and benefits of the transfer to the patient or the patient's representative; and
  3. Documentation in the patient's medical record includes:
    - a. Communication with an individual at a receiving health care institution;
    - b. The date and time of the transfer;
    - c. The mode of transportation; and
    - d. If applicable, the name of the personnel member accompanying the patient during a transfer.

**R9-10-1707. Patient Rights**

- A.** An administrator shall ensure that:
1. The requirements in subsection (B) and the patient rights in subsection (C) are conspicuously posted on the premises;
  2. At the time of admission, a patient or the patient's representative receives a written copy of the requirements in subsection (B) and the patient rights in subsection (C); and
  3. Policies and procedures include:
    - a. How and when a patient or the patient's representative is informed of patient rights in subsection (C), and
    - b. Where patient rights are posted as required in subsection (A)(1).
- B.** An administrator shall ensure that:
1. A patient is treated with dignity, respect, and consideration;
  2. A patient is not subjected to:
    - a. Abuse;
    - b. Neglect;
    - c. Exploitation;
    - d. Coercion;
    - e. Manipulation;
    - f. Sexual abuse;
    - g. Sexual assault;
    - h. Seclusion;

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- i. Restraint;
  - j. Retaliation for submitting a complaint to the Department or another entity; or
  - k. Misappropriation of personal and private property by the unclassified health care institution's personnel members, employees, volunteers, or students; and
3. A patient or the patient's representative:
    - a. Is informed of the patient complaint process;
    - b. Consents to photographs of the patient before the patient is photographed, except that a patient may be photographed when admitted to a health care institution for identification and administrative purposes; and
    - c. Except as otherwise permitted by law, provides written consent to the release of information in the patient's:
      - i. Medical record, or
      - ii. Financial records.
- C. A patient has the following rights:
1. Not to be discriminated against based on race, national origin, religion, gender, sexual orientation, age, disability, marital status, or diagnosis;
  2. To receive services that support and respect the patient's individuality, choices, strengths, and abilities;
  3. To receive privacy in care for personal needs;
  4. To review, upon written request, the patient's own medical record according to A.R.S. §§ 12-2293, 12-2294, and 12-2294.01;
  5. To receive a referral to another health care institution if the provider is not authorized or not able to provide physical health services or behavioral health services needed by the patient; and
  6. To receive assistance from a family member, representative, or other individual in understanding, protecting, or exercising the patient's rights.

**R9-10-1708. Medical Records**

- A. An administrator shall ensure that:
1. A medical record is established and maintained for each patient according to A.R.S. Title 12, Chapter 13, Article 7.1;
  2. An entry in a patient's medical record is:
    - a. Recorded only by a personnel member authorized by policies and procedures to make the entry;
    - b. Dated, legible, and authenticated; and
    - c. Not changed to make the entry illegible;
  3. An order is:
    - a. Dated when the order is entered in the patient's medical record and includes the time of the order;
    - b. Authenticated by a medical practitioner or behavioral health professional according to policies and procedures; and
    - c. If the order is a verbal order, authenticated by the medical practitioner or behavioral health professional issuing the order;
  4. If a rubber-stamp signature or an electronic signature is used to authenticate an order, the individual whose signature the rubber-stamp signature or electronic signature represents is accountable for the use of the rubber-stamp signature or electronic signature;
  5. A patient's medical record is available to an individual:
    - a. Authorized according to policies and procedures to access the patient's medical record;
    - b. If the individual is not authorized according to policies and procedures, with the written consent of the patient or the patient's representative; or
    - c. As permitted by law;
  6. Policies and procedures include the maximum time-frame to retrieve a patient's medical record at the request of a medical practitioner, behavioral health professional, or authorized personnel member; and
  7. A patient's medical record is protected from loss, damage, or unauthorized use.
- B. If a health care institution maintains a patient's medical records electronically, an administrator shall ensure that:
1. Safeguards exist to prevent unauthorized access, and
  2. The date and time of an entry in a patient's medical record is recorded by the computer's internal clock.
- C. An administrator shall ensure that a patient's medical record contains:
1. Patient information that includes:
    - a. The patient's name;
    - b. The patient's address;
    - c. The patient's date of birth; and
    - d. Any known allergies, including medication allergies;

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

2. The name of the admitting medical practitioner or behavioral health professional;
3. The date of admission and, if applicable, the date of discharge;
4. An admitting diagnosis;
5. If applicable, the name and contact information of the patient's representative and:
  - a. If the patient is 18 years of age or older or an emancipated minor, the document signed by the patient consenting for the patient's representative to act on the patient's behalf; or
  - b. If the patient's representative:
    - i. Is a legal guardian, a copy of the court order establishing guardianship; or
    - ii. Has a health care power of attorney established under A.R.S. § 36-3221 or a mental health care power of attorney executed under A.R.S. § 36-3282, a copy of the health care power of attorney or mental health care power of attorney;
6. If applicable, documented general consent and informed consent by the patient or the patient's representative;
7. Documentation of medical history and results of a physical examination;
8. A copy of the patient's health care directive, if applicable;
9. Orders;
10. Assessment;
11. Treatment plans;
12. Interval note;
13. Progress notes;
14. Documentation of health care institution services provided to the patient;
15. Disposition of the patient after discharge;
16. If applicable, documentation of any actions taken to control the patient's sudden, intense, or out-of-control behavior to prevent harm to the patient or another individual;
17. Discharge plan;
18. A discharge summary, if applicable;
19. If applicable:
  - a. Laboratory reports,
  - b. Radiologic reports,
  - c. Diagnostic reports, and
  - d. Consultation reports; and
20. Documentation of a medication administered to the patient that includes:
  - a. The date and time of administration;
  - b. The name, strength, dosage, and route of administration;
  - c. For a medication administered for pain, when initially administered or PRN:
    - i. An assessment of the patient's pain before administering the medication, and
    - ii. The effect of the medication administered;
  - d. For a psychotropic medication, when initially administered or PRN:
    - i. An assessment of the patient's behavior before administering the psychotropic medication, and
    - ii. The effect of the psychotropic medication administered;
  - e. The identification, signature, and professional designation of the individual administering or observing the self-administration of the medication; and
  - f. Any adverse reaction a patient has to the medication.

**R9-10-1709. Medication Services**

- A. An administrator shall ensure that:
  1. Policies and procedures for medication services include:
    - a. A process for providing information to a patient about medication prescribed for the patient including:
      - i. The prescribed medication's anticipated results,
      - ii. The prescribed medication's potential adverse reactions,
      - iii. The prescribed medication's potential side effects, and
      - iv. Potential adverse reactions that could result from not taking the medication as prescribed;
    - b. Procedures for preventing, responding to, and reporting a medication error;
    - c. Procedures for responding to and reporting an unexpected reaction to a medication;
    - d. Procedures to ensure that a patient's medication regimen and method of administration is reviewed by a medical practitioner and to ensure the medication regimen meets the patient's needs;
    - e. Procedures for:



## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- i. Documenting, as applicable, medication administration and assistance in the self-administration of medication; and
      - ii. Monitoring a patient who self-administers medication;
    - f. Procedures for assisting a patient in obtaining medication; and
    - g. If applicable, procedures for providing medication administration or assistance in the self-administration of medication off the premises; and
  2. A process is specified for review through the quality management program of:
    - a. A medication administration error, and
    - b. An adverse reaction to a medication.
- B.** If a health care institution provides medication administration, an administrator shall ensure that:
1. Medication is stored by the health care institution;
  2. Policies and procedures for medication administration:
    - a. Are reviewed and approved by a medical practitioner;
    - b. Specify the individuals who may:
      - i. Order medication, and
      - ii. Administer medication;
    - c. Ensure that medication is administered to a patient only as prescribed; and
    - d. Cover the documentation of a patient's refusal to take prescribed medication in the patient's medical record;
  3. Verbal orders for medication services are taken by a nurse, unless otherwise provided by law; and
  4. A medication administered to a patient:
    - a. Is administered in compliance with an order, and
    - b. Is documented in the patient's medical record.
- C.** If a health care institution provides assistance in the self-administration of medication, an administrator shall ensure that:
1. A patient's medication is stored by the health care institution;
  2. The following assistance is provided to a patient:
    - a. A reminder when it is time to take the medication;
    - b. Opening the medication container for the patient;
    - c. Observing the patient while the patient removes the medication from the container;
    - d. Verifying that the medication is taken as ordered by the patient's medical practitioner by confirming that:
      - i. The patient taking the medication is the individual stated on the medication container label,
      - ii. The patient is taking the dosage of the medication as stated on the medication container label, and
      - iii. The patient is taking the medication at the time stated on the medication container label; or
    - e. Observing the patient while the patient takes the medication;
  3. Policies and procedures for assistance in the self-administration of medication are reviewed and approved by a medical practitioner or registered nurse;
  4. Training for a personnel member, other than a medical practitioner or registered nurse, in assistance in the self-administration of medication:
    - a. Is provided by a medical practitioner or registered nurse or an individual trained by a medical practitioner or registered nurse; and
    - b. Includes:
      - i. A demonstration of the personnel member's skills and knowledge necessary to provide assistance in the self-administration of medication,
      - ii. Identification of medication errors and medical emergencies related to medication that require emergency medical intervention, and
      - iii. Process for notifying the appropriate entities when an emergency medical intervention is needed;
  5. A personnel member, other than a medical practitioner or registered nurse, completes the training in subsection (C)(4) before the personnel member provides assistance in the self-administration of medication; and
  6. Assistance in the self-administration of medication provided to a patient:
    - a. Is in compliance with an order, and
    - b. Is documented in the patient's medical record.
- D.** An administrator shall ensure that:
1. A current drug reference guide is available for use by personnel members;
  2. A current toxicology reference guide is available for use by personnel members; and
  3. If pharmaceutical services are provided on the premises:
    - a. A committee, composed of at least one physician, one pharmacist, and other personnel members as determined by policies and procedures, is established to:

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

- i. Develop a drug formulary,
    - ii. Update the drug formulary at least once every 12 months,
    - iii. Develop medication usage and medication substitution policies and procedures, and
    - iv. Specify which medications and medication classifications are required to be automatically stopped after a specific time period unless the ordering medical practitioner specifically orders otherwise;
  - b. The pharmaceutical services are provided under the direction of a pharmacist;
  - c. The pharmaceutical services comply with A.R.S. Title 36, Chapter 27; A.R.S. Title 32, Chapter 18; and 4 A.A.C. 23; and
  - d. A copy of the pharmacy license is provided to the Department upon request.
- E. When medication is stored at a health care institution, an administrator shall ensure that:
  1. Medication is stored in a separate locked room, closet, or self-contained unit used only for medication storage;
  2. Medication is stored according to the instructions on the medication container; and
  3. Policies and procedures are established, documented, and implemented to protect the health and safety of a patient for:
    - a. Receiving, storing, inventorying, tracking, dispensing, and discarding medication including expired medication;
    - b. Discarding or returning prepackaged and sample medication to the manufacturer if the manufacturer requests the discard or return of the medication;
    - c. A medication recall and notification of patients who received recalled medication; and
    - d. Storing, inventorying, and dispensing controlled substances.
- F. An administrator shall ensure that a personnel member immediately reports a medication error or a patient's adverse reaction to a medication to the medical practitioner who ordered the medication and, if applicable, the health care institution's clinical director.

**R9-10-1710. Food Services**

If food services are provided, an administrator shall ensure:

1. Food is obtained, handled, and stored to prevent contamination, spoilage, or a threat to the health of a patient;
2. Three nutritionally balanced meals are served each day;
3. Nutritious snacks are available between meals;
4. Food served meets any special dietary needs of a patient as prescribed by the patient's physician or dietitian; and
5. Chemicals and detergents are not stored with food.

**R9-10-1711. Emergency and Safety Standards**

A. An administrator shall ensure that:

1. A first aid kit is available at a health care institution;
2. If a firearm or ammunition for a firearm are stored at a health care institution:
  - a. The firearm is stored separate from the ammunition for the firearm; and
  - b. The firearm and the ammunition for the firearm are:
    - i. Stored in a locked closet, cabinet, or container; and
    - ii. Inaccessible to a patient;
3. If applicable, there is a smoke detector installed in:
  - a. A bedroom used by a patient,
  - b. A hallway in a health care institution, and
  - c. A health care institution's kitchen;
4. A smoke detector required in subsection (A)(3):
  - a. Is maintained in operable condition; and
  - b. Is battery operated or, if hard-wired into the electrical system of a health care institution, has a back-up battery;
5. A health care institution has a portable fire extinguisher that is labeled 1A-10-BC by the Underwriters Laboratory and is available to a personnel member;
6. A portable fire extinguisher required in subsection (A)(5) is:
  - a. If a disposable fire extinguisher, replaced when the fire extinguisher's indicator reaches the red zone; or
  - b. Serviced at least once every 12 months and has a tag attached to the fire extinguisher that includes the date of service;
7. A written evacuation plan is maintained and available for use by personnel members and any patient in a health care institution;
8. An evacuation drill is conducted at least once every six months; and

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

9. A record of an evacuation drill required in subsection (A)(8) is maintained for at least 12 months after the date of the evacuation drill.

**B.** An administrator shall:

1. Obtain a fire inspection conducted according to the time-frame established by the local fire department or the State Fire Marshal,
2. Make any repairs or corrections stated on the fire inspection report, and
3. Maintain documentation of a current fire inspection.

**R9-10-1712. Physical Plant, Environmental Services, and Equipment Standards**

**A.** If applicable, an administrator shall ensure that a health care institution:

1. Is in a building that:
  - a. Has a certificate of occupancy from the local jurisdiction; and
  - b. Is free of any plumbing, electrical, ventilation, mechanical, or structural hazard that may jeopardize the health or safety of a patient;
2. Has a living room accessible at all times to a patient;
3. Has a dining area furnished for group meals that is accessible to the provider, patients, and any other individuals present in the health care institution;
4. Has:
  - a. At least one bathroom for each six individuals residing in the health care institution, including patients; and
  - b. A bathroom accessible for use by a patient that contains:
    - i. A working sink with running water, and
    - ii. A working toilet that flushes and has a seat; and
5. Has equipment and supplies to maintain a patient's personal hygiene that are accessible to the patient.

**B.** An administrator shall ensure that:

1. A health care institution's premises are:
  - a. Sufficient to provide the health care institution's scope of services;
  - b. Cleaned and disinfected according to the health care institution's policies and procedures to prevent, minimize, and control illness and infection;
  - c. Clean and free from accumulations of dirt, garbage, and rubbish; and
  - d. Free from a condition or situation that may cause an individual to suffer physical injury;
2. If a health care institution collects urine or stool specimens from a patient, the health care institution has at least one bathroom that:
  - a. Contains:
    - i. A working sink with running water,
    - ii. A working toilet that flushes and has a seat,
    - iii. Toilet tissue,
    - iv. Soap for hand washing,
    - v. Paper towels or a mechanical air hand dryer,
    - vi. Lighting, and
    - vii. A means of ventilation; and
  - b. Is for the exclusive use of the health care institution;
3. A pest control program that complies with A.A.C. R3-8-201(C)(4) is implemented and documented;
4. If pets or animals are allowed in the health care institution, pets or animals are:
  - a. Controlled to prevent endangering the patients and to maintain sanitation;
  - b. Licensed consistent with local ordinances; and
  - c. For a dog or a cat, vaccinated against rabies;
5. A smoke-free environment is maintained on the premises;
6. A refrigerator used to store a medication is:
  - a. Maintained in working order, and
  - b. Only used to store medications;
7. Equipment at the health care institution is:
  - a. Sufficient to provide the health care institution's scope of service;
  - b. Maintained in working condition;
  - c. Used according to the manufacturer's recommendations; and
  - d. If applicable, tested and calibrated according to the manufacturer's recommendations or, if there are no manufacturer's recommendations, as specified in policies and procedures;

## CHAPTER 10. DEPARTMENT OF HEALTH SERVICES - HEALTH CARE INSTITUTIONS: LICENSING

8. Documentation of an equipment test, calibration, and repair is maintained for at least 12 months after the date of testing, calibration, or repair; and
9. Combustible or flammable liquids and hazardous materials stored by the health care institution are stored in the original labeled containers or safety containers in a storage area that is locked and inaccessible to patients.

## Statutory Authority

### 36-132. Department of health services; functions; contracts

A. The department, in addition to other powers and duties vested in it by law, shall:

1. Protect the health of the people of the state.
2. Promote the development, maintenance, efficiency and effectiveness of local health departments or districts of sufficient population and area that they can be sustained with reasonable economy and efficient administration, provide technical consultation and assistance to local health departments or districts, provide financial assistance to local health departments or districts and services that meet minimum standards of personnel and performance and in accordance with a plan and budget submitted by the local health department or districts to the department for approval, and recommend the qualifications of all personnel.
3. Collect, preserve, tabulate and interpret all information required by law in reference to births, deaths and all vital facts, and obtain, collect and preserve information relating to the health of the people of this state and the prevention of diseases as may be useful in the discharge of functions of the department not in conflict with chapter 3 of this title and sections 36-693, 36-694 and 39-122.
4. Operate such sanitariums, hospitals or other facilities assigned to the department by law or by the governor.
5. Conduct a statewide program of health education relevant to the powers and duties of the department, prepare educational materials and disseminate information as to conditions affecting health, including basic information for the promotion of good health on the part of individuals and communities, and prepare and disseminate technical information concerning public health to the health professions, local health officials and hospitals. In cooperation with the department of education, the department of health services shall prepare and disseminate materials and give technical assistance for the purpose of education of children in hygiene, sanitation and personal and public health, and provide consultation and assistance in community organization to counties, communities and groups of people.
6. Administer or supervise a program of public health nursing, prescribe the minimum qualifications of all public health nurses engaged in official public health work, and encourage and aid in coordinating local public health nursing services.
7. Encourage and aid in coordinating local programs concerning control of preventable diseases in accordance with statewide plans that shall be formulated by the department.
8. Encourage and aid in coordinating local programs concerning maternal and child health, including midwifery, antepartum and postpartum care, infant and preschool health and the health of schoolchildren, including special fields such as the prevention of blindness and conservation of sight and hearing.

9. Encourage and aid in the coordination of local programs concerning nutrition of the people of this state.

10. Encourage, administer and provide dental health care services and aid in coordinating local programs concerning dental public health, in cooperation with the Arizona dental association. The department may bill and receive payment for costs associated with providing dental health care services and shall deposit the monies in the oral health fund established by section 36-138.

11. Establish and maintain adequate serological, bacteriological, parasitological, entomological and chemical laboratories with qualified assistants and facilities necessary for routine examinations and analyses and for investigations and research in matters affecting public health.

12. Supervise, inspect and enforce the rules concerning the operation of public bathing places and public and semipublic swimming pools adopted pursuant to section 36-136, subsection I, paragraph 10.

13. Take all actions necessary or appropriate to ensure that bottled water sold to the public and water used to process, store, handle, serve and transport food and drink are free from filth, disease-causing substances and organisms and unwholesome, poisonous, deleterious or other foreign substances. All state agencies and local health agencies involved with water quality shall provide to the department any assistance requested by the director to ensure that this paragraph is effectuated.

14. Enforce the state food, caustic alkali and acid laws in accordance with chapter 2, article 2 of this title, chapter 8, article 1 of this title and chapter 9, article 4 of this title, and collaborate in the enforcement of the federal food, drug, and cosmetic act (52 Stat. 1040; 21 United States Code sections 1 through 905).

15. Recruit and train personnel for state, local and district health departments.

16. Conduct continuing evaluations of state, local and district public health programs, study and appraise state health problems and develop broad plans for use by the department and for recommendation to other agencies, professions and local health departments for the best solution of these problems.

17. License and regulate health care institutions according to chapter 4 of this title.

18. Issue or direct the issuance of licenses and permits required by law.

19. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.

20. Subject to the availability of monies, develop and administer programs in perinatal health care, including:

- (a) Screening in early pregnancy for detecting high-risk conditions.
- (b) Comprehensive prenatal health care.
- (c) Maternity, delivery and postpartum care.
- (d) Perinatal consultation, including transportation of the pregnant woman to a perinatal care center when medically indicated.
- (e) Perinatal education oriented toward professionals and consumers, focusing on early detection and adequate intervention to avert premature labor and delivery.

21. License and regulate the health and safety of group homes for persons with developmental disabilities. The department shall issue a license to an accredited facility for a period of the accreditation, except that no licensing period shall be longer than three years. The department is authorized to conduct an inspection of an accredited facility to ensure that the facility meets health and safety licensure standards. The results of the accreditation survey shall be public information. A copy of the final accreditation report shall be filed with the department of health services. For the purposes of this paragraph, "accredited" means accredited by a nationally recognized accreditation organization.

B. The department may accept from the state or federal government, or any agency of the state or federal government, and from private donors, trusts, foundations or eleemosynary corporations or organizations grants or donations for or in aid of the construction or maintenance of any program, project, research or facility authorized by this title, or in aid of the extension or enforcement of any program, project or facility authorized, regulated or prohibited by this title, and enter into contracts with the federal government, or an agency of the federal government, and with private donors, trusts, foundations or eleemosynary corporations or organizations, to carry out such purposes. All monies made available under this section are special project grants. The department may also expend these monies to further applicable scientific research within this state.

C. The department, in establishing fees authorized by this section, shall comply with title 41, chapter 6. The department shall not set a fee at more than the department's cost of providing the service for which the fee is charged. State agencies are exempt from all fees imposed pursuant to this section.

D. The department may enter into contracts with organizations that perform nonrenal organ transplant operations and organizations that primarily assist in the management of end-stage renal disease and related problems to provide, as payors of last resort, prescription medications necessary to supplement treatment and transportation to and from treatment facilities. The contracts may provide for department payment of administrative costs it specifically authorizes.

**36-136. [Powers and duties of director; compensation of personnel; rules; definitions](#)**

A. The director shall:

1. Be the executive officer of the department of health services and the state registrar of vital statistics but shall not receive compensation for services as registrar.
  2. Perform all duties necessary to carry out the functions and responsibilities of the department.
  3. Prescribe the organization of the department. The director shall appoint or remove personnel as necessary for the efficient work of the department and shall prescribe the duties of all personnel. The director may abolish any office or position in the department that the director believes is unnecessary.
  4. Administer and enforce the laws relating to health and sanitation and the rules of the department.
  5. Provide for the examination of any premises if the director has reasonable cause to believe that on the premises there exists a violation of any health law or rule of this state.
  6. Exercise general supervision over all matters relating to sanitation and health throughout this state. When in the opinion of the director it is necessary or advisable, a sanitary survey of the whole or of any part of this state shall be made. The director may enter, examine and survey any source and means of water supply, sewage disposal plant, sewerage system, prison, public or private place of detention, asylum, hospital, school, public building, private institution, factory, workshop, tenement, public washroom, public restroom, public toilet and toilet facility, public eating room and restaurant, dairy, milk plant or food manufacturing or processing plant, and any premises in which the director has reason to believe there exists a violation of any health law or rule of this state that the director has the duty to administer.
  7. Prepare sanitary and public health rules.
  8. Perform other duties prescribed by law.
- B. If the director has reasonable cause to believe that there exists a violation of any health law or rule of this state, the director may inspect any person or property in transportation through this state, and any car, boat, train, trailer, airplane or other vehicle in which that person or property is transported, and may enforce detention or disinfection as reasonably necessary for the public health if there exists a violation of any health law or rule.
- C. The director, after consultation with the department of administration, may take all necessary steps to enhance the highest and best use of the state hospital property, including contracting with third parties to provide services, entering into short-term lease agreements with third parties to occupy or renovate existing buildings and entering into long-term lease agreements to develop the land and buildings. The director shall deposit any monies collected from contracts and lease agreements entered into pursuant to this subsection in the Arizona state hospital charitable trust fund established by section 36-218. At least thirty days before issuing a request for proposals pursuant to this subsection, the department of health services shall hold a public hearing to receive community and provider input regarding the highest and best use of the state hospital property



related to the request for proposals. The department shall report to the joint committee on capital review on the terms, conditions and purpose of any lease or sublease agreement entered into pursuant to this subsection relating to state hospital lands or buildings or the disposition of real property pursuant to this subsection, including state hospital lands or buildings, and the fiscal impact on the department and any revenues generated by the agreement. Any lease or sublease agreement entered into pursuant to this subsection relating to state hospital lands or buildings or the disposition of real property pursuant to this subsection, including state hospital lands or buildings, must be reviewed by the joint committee on capital review.

D. The director may deputize, in writing, any qualified officer or employee in the department to do or perform on the director's behalf any act the director is by law empowered to do or charged with the responsibility of doing.

E. The director may delegate to a local health department, county environmental department or public health services district any functions, powers or duties that the director believes can be competently, efficiently and properly performed by the local health department, county environmental department or public health services district if:

1. The director or superintendent of the local health agency, environmental agency or public health services district is willing to accept the delegation and agrees to perform or exercise the functions, powers and duties conferred in accordance with the standards of performance established by the director of the department of health services.

2. Monies appropriated or otherwise made available to the department for distribution to or division among counties or public health services districts for local health work may be allocated or reallocated in a manner designed to ensure the accomplishment of recognized local public health activities and delegated functions, powers and duties in accordance with applicable standards of performance. If in the director's opinion there is cause, the director may terminate all or a part of any delegation and may reallocate all or a part of any funds that may have been conditioned on the further performance of the functions, powers or duties conferred.

F. The compensation of all personnel shall be as determined pursuant to section 38-611.

G. The director may make and amend rules necessary for the proper administration and enforcement of the laws relating to the public health.

H. Notwithstanding subsection I, paragraph 1 of this section, the director may define and prescribe emergency measures for detecting, reporting, preventing and controlling communicable or infectious diseases or conditions if the director has reasonable cause to believe that a serious threat to public health and welfare exists. Emergency measures are effective for not longer than eighteen months.

I. The director, by rule, shall:

1. Define and prescribe reasonably necessary measures for detecting, reporting, preventing and controlling communicable and preventable diseases. The rules shall declare certain diseases reportable. The rules shall prescribe measures, including isolation or quarantine, that are reasonably required to prevent the occurrence of, or to seek early detection and alleviation of, disability, insofar as possible, from communicable or preventable diseases. The rules shall include reasonably necessary measures to control animal diseases transmittable to humans.

2. Define and prescribe reasonably necessary measures, in addition to those prescribed by law, regarding the preparation, embalming, cremation, interment, disinterment and transportation of dead human bodies and the conduct of funerals, relating to and restricted to communicable diseases and regarding the removal, transportation, cremation, interment or disinterment of any dead human body.

3. Define and prescribe reasonably necessary procedures that are not inconsistent with law in regard to the use and accessibility of vital records, delayed birth registration and the completion, change and amendment of vital records.

4. Except as relating to the beneficial use of wildlife meat by public institutions and charitable organizations pursuant to title 17, prescribe reasonably necessary measures to ensure that all food or drink, including meat and meat products and milk and milk products sold at the retail level, provided for human consumption is free from unwholesome, poisonous or other foreign substances and filth, insects or disease-causing organisms. The rules shall prescribe reasonably necessary measures governing the production, processing, labeling, storing, handling, serving and transportation of these products. The rules shall prescribe minimum standards for the sanitary facilities and conditions that shall be maintained in any warehouse, restaurant or other premises, except a meat packing plant, slaughterhouse, wholesale meat processing plant, dairy product manufacturing plant or trade product manufacturing plant. The rules shall prescribe minimum standards for any truck or other vehicle in which food or drink is produced, processed, stored, handled, served or transported. The rules shall provide for the inspection and licensing of premises and vehicles so used, and for abatement as public nuisances of any premises or vehicles that do not comply with the rules and minimum standards. The rules shall provide an exemption relating to food or drink that is:

(a) Served at a noncommercial social event such as a potluck.

(b) Prepared at a cooking school that is conducted in an owner-occupied home.

(c) Not potentially hazardous and prepared in a kitchen of a private home for occasional sale or distribution for noncommercial purposes.

(d) Prepared or served at an employee-conducted function that lasts less than four hours and is not regularly scheduled, such as an employee recognition, an employee fundraising or an employee social event.

(e) Offered at a child care facility and limited to commercially prepackaged food that is not potentially hazardous and whole fruits and vegetables that are washed and cut on-site for immediate consumption.

(f) Offered at locations that sell only commercially prepackaged food or drink that is not potentially hazardous.

(g) A cottage food product that is not potentially hazardous or a time or temperature control for safety food and that is prepared in a kitchen of a private home for commercial purposes, including fruit jams and jellies, dry mixes made with ingredients from approved sources, honey, dry pasta and roasted nuts. Cottage food products must be packaged at home with an attached label that clearly states the name and registration number of the food preparer, lists all the ingredients in the product and the product's production date and includes the following statement: "This product was produced in a home kitchen that may process common food allergens and is not subject to public health inspection." If the product was made in a facility for individuals with developmental disabilities, the label must also disclose that fact. The person preparing the food or supervising the food preparation must complete a food handler training course from an accredited program and maintain active certification. The food preparer must register with an online registry established by the department pursuant to paragraph 13 of this subsection. The food preparer must display the preparer's certificate of registration when operating as a temporary food establishment. For the purposes of this subdivision, "not potentially hazardous" means cottage food products that meet the requirements of the food code published by the United States food and drug administration, as modified and incorporated by reference by the department by rule.

(h) A whole fruit or vegetable grown in a public school garden that is washed and cut on-site for immediate consumption.

(i) Produce in a packing or holding facility that is subject to the United States food and drug administration produce safety rule (21 Code of Federal Regulations part 112) as administered by the Arizona department of agriculture pursuant to title 3, chapter 3, article 4.1. For the purposes of this subdivision, "holding", "packing" and "produce" have the same meanings prescribed in section 3-525.

(j) Spirituous liquor produced on the premises licensed by the department of liquor licenses and control. This exemption includes both of the following:

(i) The area in which production and manufacturing of spirituous liquor occurs, as defined in an active basic permit on file with the United States alcohol and tobacco tax and trade bureau.

(ii) The area licensed by the department of liquor licenses and control as a microbrewery, farm winery or craft distiller that is open to the public and serves spirituous liquor and commercially prepackaged food, crackers or pretzels for consumption on the premises. A producer of spirituous liquor may not provide, allow or expose for common use any cup, glass or other receptacle used for drinking purposes. For the purposes of this item, "common use" means the use of a drinking receptacle for

drinking purposes by or for more than one person without the receptacle being thoroughly cleansed and sanitized between consecutive uses by methods prescribed by or acceptable to the department.

5. Prescribe reasonably necessary measures to ensure that all meat and meat products for human consumption handled at the retail level are delivered in a manner and from sources approved by the Arizona department of agriculture and are free from unwholesome, poisonous or other foreign substances and filth, insects or disease-causing organisms. The rules shall prescribe standards for sanitary facilities to be used in identity, storage, handling and sale of all meat and meat products sold at the retail level.

6. Prescribe reasonably necessary measures regarding production, processing, labeling, handling, serving and transportation of bottled water to ensure that all bottled drinking water distributed for human consumption is free from unwholesome, poisonous, deleterious or other foreign substances and filth or disease-causing organisms. The rules shall prescribe minimum standards for the sanitary facilities and conditions that shall be maintained at any source of water, bottling plant and truck or vehicle in which bottled water is produced, processed, stored or transported and shall provide for inspection and certification of bottled drinking water sources, plants, processes and transportation and for abatement as a public nuisance of any water supply, label, premises, equipment, process or vehicle that does not comply with the minimum standards. The rules shall prescribe minimum standards for bacteriological, physical and chemical quality for bottled water and for the submission of samples at intervals prescribed in the standards.

7. Define and prescribe reasonably necessary measures governing ice production, handling, storing and distribution to ensure that all ice sold or distributed for human consumption or for preserving or storing food for human consumption is free from unwholesome, poisonous, deleterious or other foreign substances and filth or disease-causing organisms. The rules shall prescribe minimum standards for the sanitary facilities and conditions and the quality of ice that shall be maintained at any ice plant, storage and truck or vehicle in which ice is produced, stored, handled or transported and shall provide for inspection and licensing of the premises and vehicles, and for abatement as public nuisances of ice, premises, equipment, processes or vehicles that do not comply with the minimum standards.

8. Define and prescribe reasonably necessary measures concerning sewage and excreta disposal, garbage and trash collection, storage and disposal, and water supply for recreational and summer camps, campgrounds, motels, tourist courts, trailer coach parks and hotels. The rules shall prescribe minimum standards for preparing food in community kitchens, adequacy of excreta disposal, garbage and trash collection, storage and disposal and water supply for recreational and summer camps, campgrounds, motels, tourist courts, trailer coach parks and hotels and shall provide for inspection of these premises and for abatement as public nuisances of any premises or facilities that do not comply with the rules. Primitive camp and picnic grounds offered by this state or a political subdivision of this state are exempt from rules adopted pursuant to this paragraph but are subject to approval by a county health department under sanitary regulations adopted pursuant to section 36-183.02. Rules adopted pursuant to this paragraph do not apply to two or fewer recreational vehicles as defined in section 33-2102 that are not park models or park trailers, that are parked on owner-occupied residential property for less than sixty days and for which no rent or other compensation is

paid. For the purposes of this paragraph, "primitive camp and picnic grounds" means camp and picnic grounds that are remote in nature and without accessibility to public infrastructure such as water, electricity and sewer.

9. Define and prescribe reasonably necessary measures concerning the sewage and excreta disposal, garbage and trash collection, storage and disposal, water supply and food preparation of all public schools. The rules shall prescribe minimum standards for sanitary conditions that shall be maintained in any public school and shall provide for inspection of these premises and facilities and for abatement as public nuisances of any premises that do not comply with the minimum standards.

10. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious health conditions at these places. The rules shall prescribe minimum standards for sanitary conditions that shall be maintained at any public or semipublic swimming pool or bathing place and shall provide for inspection of these premises and for abatement as public nuisances of any premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of environmental quality and shall be consistent with the rules adopted by the director of the department of environmental quality pursuant to section 49-104, subsection B, paragraph 12.

11. Prescribe reasonably necessary measures to keep confidential information relating to diagnostic findings and treatment of patients, as well as information relating to contacts, suspects and associates of communicable disease patients. In no event shall confidential information be made available for political or commercial purposes.

12. Prescribe reasonably necessary measures regarding human immunodeficiency virus testing as a means to control the transmission of that virus, including the designation of anonymous test sites as dictated by current epidemiologic and scientific evidence.

13. Establish an online registry of food preparers that are authorized to prepare cottage food products for commercial purposes pursuant to paragraph 4 of this subsection. A registered food preparer shall renew the registration every three years and shall provide to the department updated registration information within thirty days after any change.

14. Prescribe an exclusion for fetal demise cases from the standardized survey known as "the hospital consumer assessment of healthcare providers and systems".

J. The rules adopted under the authority conferred by this section shall be observed throughout the state and shall be enforced by each local board of health or public health services district, but this section does not limit the right of any local board of health or county board of supervisors to adopt ordinances and rules as authorized by law within its jurisdiction, provided that the ordinances and rules do not conflict with state law and are equal to or more restrictive than the rules of the director.

K. The powers and duties prescribed by this section do not apply in instances in which regulatory powers and duties relating to public health are vested by the legislature in any other state board,

commission, agency or instrumentality, except that with regard to the regulation of meat and meat products, the department of health services and the Arizona department of agriculture within the area delegated to each shall adopt rules that are not in conflict.

L. The director, in establishing fees authorized by this section, shall comply with title 41, chapter 6. The department shall not set a fee at more than the department's cost of providing the service for which the fee is charged. State agencies are exempt from all fees imposed pursuant to this section.

M. After consultation with the state superintendent of public instruction, the director shall prescribe the criteria the department shall use in deciding whether or not to notify a local school district that a pupil in the district has tested positive for the human immunodeficiency virus antibody. The director shall prescribe the procedure by which the department shall notify a school district if, pursuant to these criteria, the department determines that notification is warranted in a particular situation. This procedure shall include a requirement that before notification the department shall determine to its satisfaction that the district has an appropriate policy relating to nondiscrimination of the infected pupil and confidentiality of test results and that proper educational counseling has been or will be provided to staff and pupils.

N. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (f) of this section, food and drink are exempt from the rules prescribed in subsection I of this section if offered at locations that sell only commercially prepackaged food or drink that is not potentially hazardous, without a limitation on its display area.

O. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (h) of this section, a whole fruit or vegetable grown in a public school garden that is washed and cut on-site for immediate consumption is exempt from the rules prescribed in subsection I of this section.

P. Until the department adopts an exclusion by rule as required by subsection I, paragraph 14 of this section, the standardized survey known as "the hospital consumer assessment of healthcare providers and systems" may not include patients who experience a fetal demise.

Q. Until the department adopts exemptions by rule as required by subsection I, paragraph 4, subdivision (j) of this section, spirituous liquor and commercially prepackaged food, crackers or pretzels that meet the requirements of subsection I, paragraph 4, subdivision (j) of this section are exempt from the rules prescribed in subsection I of this section.

R. For the purposes of this section:

1. "Cottage food product":

(a) Means a food that is not potentially hazardous or a time or temperature control for safety food as defined by the department in rule and that is prepared in a home kitchen by an individual who is registered with the department.

(b) Does not include foods that require refrigeration, perishable baked goods, salsas, sauces, fermented and pickled foods, meat, fish and shellfish products, beverages, acidified food products, nut butters or other reduced-oxygen packaged products.

2. "Fetal demise" means a fetal death that occurs or is confirmed in a licensed hospital. Fetal demise does not include an abortion as defined in section 36-2151.

### 36-405. Powers and duties of the director

A. The director shall adopt rules to establish minimum standards and requirements for constructing, modifying and licensing health care institutions necessary to ensure the public health, safety and welfare. The standards and requirements shall relate to the construction, equipment, sanitation, staffing for medical, nursing and personal care services, and recordkeeping pertaining to administering medical, nursing, behavioral health and personal care services, in accordance with generally accepted practices of health care. The standards shall require that a physician who is licensed pursuant to title 32, chapter 13 or 17 medically discharge patients from surgery and shall allow an outpatient surgical center to require that either an anesthesia provider who is licensed pursuant to title 32, chapter 13, 15 or 17 or a physician who is licensed pursuant to title 32, chapter 13 or 17 remain present on the premises until all patients are discharged from the recovery room. Except as otherwise provided in this subsection, the director shall use the current standards adopted by the joint commission on accreditation of hospitals and the commission on accreditation of the American osteopathic association or those adopted by any recognized accreditation organization approved by the department as guidelines in prescribing minimum standards and requirements under this section.

B. The director, by rule, may:

1. Classify and subclassify health care institutions according to character, size, range of services provided, medical or dental specialty offered, duration of care and standard of patient care required for the purposes of licensure. Classes of health care institutions may include hospitals, infirmaries, outpatient treatment centers, health screening services centers and residential care facilities. Whenever the director reasonably deems distinctions in rules and standards to be appropriate among different classes or subclasses of health care institutions, the director may make such distinctions.

2. Prescribe standards for determining a health care institution's substantial compliance with licensure requirements.

3. Prescribe the criteria for the licensure inspection process.

4. Prescribe standards for selecting health care-related demonstration projects.

5. Establish nonrefundable application and licensing fees for health care institutions, including a grace period and a fee for the late payment of licensing fees.

6. Establish a process for the department to notify a licensee of the licensee's licensing fee due date.

7. Establish a process for a licensee to request a different licensing fee due date, including any limits on the number of requests by the licensee.

C. The director, by rule, shall adopt licensing provisions that facilitate the colocation and integration of outpatient treatment centers that provide medical, nursing and health-related services with behavioral health services consistent with article 3.1 of this chapter.

D. Ninety percent of the fees collected pursuant to this section shall be deposited, pursuant to sections 35-146 and 35-147, in the health services licensing fund established by section 36-414 and ten percent of the fees collected pursuant to this section shall be deposited, pursuant to sections 35-146 and 35-147, in the state general fund.

E. Subsection B, paragraph 5 of this section does not apply to a health care institution operated by a state agency pursuant to state or federal law or to adult foster care residential settings.

#### 36-406. Powers and duties of the department

In addition to its other powers and duties:

1. The department shall:

(a) Administer and enforce this chapter and the rules, regulations and standards adopted pursuant thereto.

(b) Review, and may approve, plans and specifications for construction or modification or additions to health care institutions regulated by this chapter.

(c) Have access to books, records, accounts and any other information of any health care institution reasonably necessary for the purposes of this chapter.

(d) Require as a condition of licensure that nursing care institutions and assisted living facilities make vaccinations for influenza and pneumonia available to residents on site on a yearly basis. The department shall prescribe the manner by which the institutions and facilities shall document compliance with this subdivision, including documenting residents who refuse to be immunized. The department shall not impose a violation on a licensee for not making a vaccination available if there is a shortage of that vaccination in this state as determined by the director.

2. The department may:

(a) Make or cause to be made inspections consistent with standard medical practice of every part of the premises of health care institutions which are subject to the provisions of this chapter as well as those which apply for or hold a license required by this chapter.



(b) Make studies and investigations of conditions and problems in health care institutions, or any class or subclass thereof, as they relate to compliance with this chapter and rules, regulations and standards adopted pursuant thereto.

(c) Develop manuals and guides relating to any of the several aspects of physical facilities and operations of health care institutions or any class or subclass thereof for distribution to the governing authorities of health care institutions and to the general public.