Annex 24

CHAPTER 7.6.

**ANIMAL WELFARE AT THE TIME OF KILLING FOR PURPOSES OTHER THAN SLAUGHTER**

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| Australia | **Category:** General comment on Chapter 7.6  We appreciate the amount of work it has taken to develop this chapter. However, the chapter could benefit from further development to provide a practical and useful guide for Members when deciding on appropriate methods of depopulation of animals. Examples of areas that could be improved or expanded upon include:   * Additional guidance should be added regarding appropriate circumstances for use of different methods. For example, several methods note they should be considered as a last resort however it is not obvious what would constitute such a situation. * Several articles could benefit from the addition of further detail regarding the methodology and species-specific factors affecting their use. For example, if there are specific size limits. * There are also obvious differences in the level of detail in some articles compared to others – for example, some articles provide detailed lists of animal welfare indicators, while other note only two or three items. Articles could be made more consistent in this regard. * References are occasionally provided in text however do not align with the reference list provided, which is also inconsistent in its formatting. In some cases, it is unclear which document is referenced – for example, EFSA 2019 is included in text but not mentioned in the reference list, and EFSA published several documents that year which are relevant and could be the source of the information. In-text references should be reviewed to assure they are represented in the reference list. * To further facilitate the general principle that ‘*when loss of consciousness is not immediate, induction of unconsciousness should not cause avoidable distress, fear, and pain’*, the recommendations in the killing articles for having a back-up method need to be followed with suggestions/recommendations for an appropriate method. Factors to consider include the primary killing method employed and its use context, the animal species, and the likely level of distress and pain experienced when the primary method is ineffective. For example, if use of a firearm or captive bolt has caused injury but not death then distress is not avoidable, and rapid killing methods otherwise recommended for use in unconscious animals may be appropriate.   Failing to employ an effective back-up procedure promptly can greatly amplify poor animal welfare and risks creating a worse welfare outcome than is expected from effective use of any of the methods presented in the chapter. In the proposed amended texts for each killing method, a back-up method sentence has been added however suitable backup method(s) need to be specified.   * The suitability of each method is dependent on the animal species. If the wrong method is chosen for the species and is ineffective, the attempt may result in considerable distress, fear, and pain. One solution to avoid any uncertainty or ambiguity in the Code is to state the species suitability at the beginning of each method. In the proposed amended texts, a species sentence has been moved or added to the beginning of the article. * Guidance should be provided to assist users of the Code in identifying appropriate and preferred methods of primary and secondary killing, such as through a table identifying preferred options for different species. Many of the killing methods described in the articles explicitly state significant animal welfare concerns with their use, including that loss of consciousness is not immediate and can take a long time, and that conducting the procedure while conscious is expected to cause considerable distress and pain. To optimise animal welfare utilising guidance in the Code, the responsible agent needs to readily see which killing methods are most suitable and which methods are not recommended and why. Without this clarity in Chapter 7.6, there is a risk that providing recommendations for the use of all methods may be interpreted that each method may be suitable, and that the WOAH equally sanctions each method. Further, when the responsible agent considers cost-effectiveness, there is a risk that this lack of clarity in the Code, could be used to unnecessarily trade optimal welfare for the lowest cost method.   Several comprehensive sources of information may be of use in further development of this chapter, including:   * AVMA Guidelines for the Depopulation of Animals: 2019 Edition. <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf>. * AVMA Humane Slaughter Guidelines 2024, available at https://www.avma.org/stes/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf * Hewitt, L. and Small, A., 2021. An independent animal welfare assessment of mass destruction methods for pigs on-farm. [An independent animal welfare assessment of mass destruction methods for pigs on-farm](https://www.agriculture.gov.au/sites/default/files/documents/independent-animal-welfare-assessment-mass-destruction-methods-pigs-on-farm.pdf). Accessed 12 May 2025. * EFSA Journal articles on killing for purposes other than slaughter for horses, poultry, sheep and goats, cattle, pigs and other species – available at https://www.efsa.europa.eu/en/search?s=&f%5B0%5D=topic%3A363 * AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at <https://animalhealthaustralia.com.au/ausvetplan/_> * Humane Slaughter Association (UK) guidelines including humane killing of livestock using firearms, emergency slaughter, and on-farm killing for disease control purposes, available at https://www.hsa.org.uk/publications/online-guides |

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| Australia | **Change**: Editorial  **Proposed amended text**:  ANIMAL WELFARE ~~AT THE TIME OF~~ WHEN KILLING ANIMALS FOR PURPOSES OTHER THAN ~~SLAUGHTER~~ PRODUCING ANIMAL PRODUCTS  **Rationale:**  The title needs revision because use of the term slaughter in the title is inconsistent with the Code definition in its glossary: *Slaughter means any procedure that causes the death of an animal by bleeding*. We recommend therefore that this change is reflected across the chapter accordingly. |

Article 7.6.1.

Introduction

Animals are killed for a variety of reasons, including those that may not make the transport for *slaughter* or the safe use of their products possible. Such reasons may include for contagious disease control, in cases where their welfare may be compromised due to ~~of~~ natural or ~~man-made~~ human-made disasters, when they are otherwise suffering from disease or injuries or for economic reasons. It is important to ~~consider~~ optimise their welfare during such killing for purposes other than slaughter ~~this process~~.

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| Australia | **Category**: Change  **Proposed amended text**:  Animals are killed for a variety of reasons, including those that may not make ~~the~~ transport for *slaughter* or the safe use of their products possible. Such reasons may include for contagious disease control, in cases where their welfare may be compromised due to ~~of~~ natural or ~~man-made~~ human-made disasters, when they are otherwise suffering from disease or injuries ~~or for economic reasons~~. It is important to ~~consider~~ optimise ~~their~~ animal welfare ~~during such~~ when killing for purposes other than slaughter ~~this process~~.  **Rationale:**  Minor editorial changes to improve readability.  Given this is a short and non-exhaustive list Australia recommends that killing animals for economic reasons should be omitted from this text. This is to avoid implying that killing (separate to slaughter, or euthanasia for health/welfare reasons) should be routinely used as a method of economic management of a farm or establishment. |

Article 7.6.2.

Scope

This chapter identifies hazards to animal welfare during *killing* forpurposes other than *slaughter* and provides recommendations for the appropriate procedures for such *killing*. It provides animal-based and other measures to assess the level of welfare during the process and recommends appropriate remedial actions to be applied.

This chapter applies to the killing of domestic and *captive wild* ~~ruminants, equids, birds, pigs, rabbits, camelids and mustelids for all purposes, except for slaughter which is covered by Chapter 7.5. Animal welfare during slaughter~~ mammals and birds (hereafter animals). Killing of reptiles is covered by Chapter 7.14.Killing of reptiles for their skin, meat and other products and killing of dogs for population management is covered by Chapter 7.7. The numbers of animals killed is situation dependent and could range from an individual to a large scale population.

This chapter should be read in conjunction with the guiding principles for *animal welfare* provided in Chapter 7.1.

Article 7.6.3.

General principles ~~for the operations regarding the~~ *~~killing~~* ~~of animals~~

The decision as to whether to kill animals should not be delayed if there is any risk to the welfare of those animals. The recommendations in this Chapter are based on the premise that a decision to kill the animals has been made and they address the need to ensure the welfare of the animals until they are dead.

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| Australia | **Category:** Change  **Proposed amended text:**  ~~The~~ A decision as to whether to kill animals due to compromised welfare should not be delayed longer than necessary ~~if there is any risk to the welfare of those animals~~. To optimise welfare, an assessment should consider the welfare impact of killing. The recommendations in this Chapter are based on the premise that a decision to kill the animals has been made and they address the need to ensure the welfare of the animals until they are dead.  **Rationale:**  The principle of deciding to kill for welfare reasons needs to be qualified to avoid causing additional and avoidable distress fear and pain.  The addition of “longer than necessary” removes the implication that killing should occur without some time for consideration of other important factors outside of animal welfare, such as availability of properly trained personnel, equipment needed, and the ability to remove and destroy carcasses safely (as noted further into this article). Even with advanced planning, the logistics of implementing these may require some further time. These factors themselves can have negative impacts on animal welfare during the killing process if minimum requirements are not met. |

During decision making and prior to *killing* the animals, appropriate husbandry, especially supply of feed and water and thermal comfort, should be maintained until the animals are killed. Medical care should be provided if needed.

Advanced planning for various scenarios, including adverse events, should clearly identify operational procedures and responsibilities.

For large scale killing, specific plans should be in place.

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| Australia | **Category**: Addition    **Proposed amended text:**  For large scale killing, specific plan~~s~~ning and preparation should be in place.  **Rationale**:    It is important to ensure necessary provisions are in place in advance through both effective planning and preparation. It is also important to stockpile any relevant equipment that may be required. For example, specific gasses, facilities, resources and tools may be needed. These must be accessible and available, especially if required at short notice. For maximum preparedness, all relevant personnel should undertake training and preparedness activities in advance. |

The decision maker should be clearly identified to ensure decision making is not delayed.

All personnel involved in the killing of animals should have the relevant skills and competencies, acquired through training or experience.

As necessary, operational procedures should be evidence-based adapted to the specific circumstances in the affected locations or on the premises and should address, apart from animal welfare, the cost, effectiveness, and the speed of implementation of the method, operators’ safety and mental health, biosecurity and environmental aspects relevant to the species.

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| Australia | **Category:** Deletion  **Proposed amended text:**  As necessary, operational procedures should be evidence-based adapted to the specific circumstances in the affected locations or on the premises and should address, apart from animal welfare, ~~the cost, effectiveness, and the speed of implementation of the method,~~ operators’ safety and mental health, biosecurity and environmental aspects relevant to the species.  **Rationale:**  The consideration of cost has been deleted in Article 7.6.6 (d) and needs deleting here for consistency.  Inclusion of the terms ‘effectiveness’ and ‘speed’ are a contradiction in the sentence (‘apart from animal welfare’) because the degree to which the operational procedure of killing is effective, and the speed of implementation, are factors directly affecting animal welfare. |

~~During decision making and prior to killing the animals, normal husbandry, especially supply of feed and water, should be maintained until the animals are killed.~~

Animals might be killed on site or moved to a dedicated place for killing. The handling and movement of animals should be minimised and carried out in accordance with the recommendations described below.

When restraint is required ~~Animal restraint~~ it should be sufficient to facilitate effective killing, and in accordance with animal welfare and operator safety requirements~~. When restraint is required~~, and killing should follow without ~~minimal~~ delay. The type and size of restraint deployed should be appropriate for the age, size and species of animal to be killed. When herding or corralling is applied, a low-stress method using appropriate apparatus to facilitate the safe and effective killing of animals should be used.

Killing methods used should result in immediate death or loss of consciousness lasting until death. When loss of consciousness is not immediate, induction of unconsciousness ~~should involve as little aversion as possible and~~ should not cause avoidable distress, fear and pain. A backup procedure should be available and used to kill the animal if the first method does not result in death or unconsciousness.

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| Australia | **Category**: Editorial  **Proposed amended text**:  Killing methods used should result in immediate death or loss of consciousness lasting until death. When loss of consciousness is not immediate, induction of unconsciousness ~~should involve as little aversion as possible and~~ should not cause avoidable distress, fear and pain. ~~A backup procedure~~ An alternative method for killing should be available and used to kill the animal if the first method does not result in death or unconsciousness.  **Rationale:**  Use of ‘method’ for consistency of language throughout document. However, clarity around the difference between “method” and “procedure” in this context should be considered as the terms appear to be used interchangeably in Chapter 7.6  **Supporting evidence, if relevant:**  WOAH Terrestrial Animal Health Code, Chapters 7.6.1 Points 2, 6; 7.6.3, 2a, part i; 7.6.4 Points 4 & 6. ‘Method’ in reference to euthanasia and killing mentioned 91 times in Chapter 7.6. |
| Australia | **Category:** Addition  **Proposed amended text**:  Killing methods used should result in immediate death or loss of consciousness lasting until death and be appropriate for the age, size and species of animal. When loss of consciousness is not immediate, induction of unconsciousness ~~should involve as little aversion as possible and~~ should not cause avoidable distress, fear and pain. A backup procedure should be available and used to kill the animal if the first method does not result in rapid death or unconsciousness.  **Rationale:**  Killing methods need to be appropriate for the species and age/weight class of animal in order to be effective and to ensure that animal welfare is optimised.  As an example, a penetrating captive bolt followed by a secondary terminal procedure may be a suitable destruction method for weaner, grower and finisher pigs whereas a non-penetrating captive bolt is only suitable for piglets <10kg and manual blunt force trauma to the head is only suitable for piglets <5kg.  Addition of “rapid” as it may also be necessary to use a backup procedure should the first method appear to be working, but more slowly than is expected or acceptable for welfare reasons.  **Supporting evidence, if relevant:**  Hewitt, L & Small, A 2021, *An independent animal welfare assessment of mass destruction methods for pigs on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, November. CC BY 4.0.  Animal Health Australia (2015). *Operational manual: Destruction of animals (Version 3.2)*. Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Agriculture Ministers’ Forum, Canberra, ACT.  European Food Safety Authority (EFSA) Scientific Panel on Animal Health and Welfare, Nielsen, SS, Alvarez, J, Bicout, DJ, Calistri, P, Depner, K, Drewe, JA, Garin-Bastuji, B, Gonzales Rojas, JL, Gortázar Schmidt, C, Michel, V, Miranda Chueca, MÁ, Roberts, HC, Sihvonen, LH, Spoolder, H, Stahl, K, Viltrop, A, Winckler, C, Candiani, D, Fabris, C, Van der Stede, Y & Velarde, A, 2020b, Scientific Opinion on the welfare of pigs during killing for purposes other than slaughter, EFSA Journal, vol. 18, no. 7, pp. 1-72, DOI: 10.2903/j.efsa.2020.6195 |

~~Young animals should be killed before older animals on which they are dependent to reduce potential distress.~~

Planning should take into account the order in which animals are killed. Where possible vulnerable animals should be killed as a matter of priority, which may include:

• groups with symptomatic animals,

• animals that are unable to obtain feed or water,

• animals that have compromised housing or are without shelter,

• young [REF] or unweaned animals should be killed before older animals on which they are dependent,

• potentially dangerous or aggressive animals, such as bulls, sows with litters, or boars,

• animals in late stage of pregnancy or in parturition, and

• animals in-utero may need to be ~~humanely~~killed following the killing of the dam if the amniotic sac is ruptured.

~~For disease control purposes and for biosecurity considerations, infected animals should be killed first, followed by in-contact animals, and then remaining animals.~~

There should be continuous monitoring of the operational procedures to ensure they are consistently effective regarding animal welfare, operator safety and mental health ~~and~~, *biosecurity* and environmental aspects.

When large scale or disease control ~~the~~ operational procedures are concluded, there should be a debriefing session or written report describing the practices adopted and their effect on animal welfare, operator safety, *biosecurity and responsible personnel*.

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| Australia | **Category**: Editorial  **Proposed amended text**:  There should be continuous monitoring of the operational procedures to ensure they are consistently effective ~~regarding~~ at meeting animal welfare, operator safety and mental health ~~and~~, *biosecurity* and environmental ~~aspects~~ requirements.  When large scale or disease control ~~the~~ operational procedures are concluded, there should be a debriefing session or written report describing the practices adopted and their effect on animal welfare, operator safety, efficacy of *biosecurity* and *~~responsible personnel~~* environmental impact.  **Rationale:**  Wording adjusted in first sentence to improve readability and to emphasise that the operational destruction procedures should be consistently meeting the minimum requirements across all of the listed categories.  Recommend removal of “responsible personnel” in the second sentence as unable to find a definition for this term in the WOAH Terrestrial Animal Health Code Glossary and it also seems to be out-of-place in this sentence. Suggested additions to align with the text provided under Article 7.6.5 1. Team Leader a) Responsibilities point (viii) |

Article 7.6.5.

Responsibilities, training and competencies of the specialist team for the operations regarding the ~~mass~~ killing of animals

All personnel have a crucial role to play in ensuring good animal welfare conditions through to the killing. Training for all personnel should emphasise the importance of animal welfare and their responsibility in contributing to the welfare of the animals.

Competencies may be gained through a combination of formal training and practical experience. These competencies should be assessed by the *Competent Authority* or by an independent body recognised by the *Competent Authority*

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| Australia | **Category:** Addition  **Proposed amended text:**  Competencies may be gained through a combination of formal training and practical experience. These competencies should, where relevant, be assessed by the *Competent Authority* or by an independent body recognised by the *Competent Authority*  **Rationale:**  Not all situations for the killing of animals will involve the Competent Authority, and in smaller scale situations there may be no formal training or assessment. For example, a farmer who is performing killing of a moderate number of animals for non-notifiable disease control purposes may rely on their own expertise in conjunction with veterinary advice but without government involvement, and government authorities would not normally assess the competency of a farmer.  Alternatively, the previous changes to remove reference to mass killing for this article should be rejected and/or other clarification added to indicate it only applies to large scale killing of animals under competent authority control. |

1. Team leader
2. Responsibilities
3. plan overall operations on affected location or premises;

(ii) determine and address requirements for *animal welfare*, operator safety and *biosecurity*;

(iii) organise and manage team of people to facilitate *killing* of the relevant animals on the location or premises in accordance with national regulations and these recommendations;

1. determine logistics required;

(v) monitor operations to ensure *animal welfare*, operator safety and *biosecurity* requirements are met;

(vi) seek and use veterinary advice;

(vii) report upwards on progress and problems;

(viii) provide a written report at the conclusion of the *killing* operation, describing the practices adopted and their effect on *animal welfare*, operator safety, efficacy of *biosecurity* and environmental impact.

1. Training and c~~C~~ompetencies
2. ~~knowledge~~ understanding of and experience with relevant animal husbandry practices;
3. ~~knowledge~~ understanding of *animal welfare,* impact of *~~,~~* different killing methods, and the details, planning and implementation of the *killing* operation~~,~~ ; ~~and the underpinning behavioural, anatomical and physiological processes involved in the~~ *~~killing~~* ~~operation;~~
4. leadership and ability to ~~skills to~~ manage all activities on the location or premises ~~and deliver outcomes on time~~;
5. awareness of psychological effects on farmer, team members or person(s) in charge of animals [AVMA, 2019], and general public;

~~iv)~~ v) awareness of fatigue effects on those carrying out repeated killing of large numbers of animals and on the effectiveness of the procedure [AVMA, 2019].

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~iv)~~ v) awareness of fatigue effects on those carrying out repeated killing ~~of large numbers~~ of animals and on the effectiveness of the procedure [AVMA, 2019].  **Rationale:**  Repeated killing does not require large numbers to be fatiguing. Fatigue can occur with repetition involving small to moderate numbers of animals. Fatigue can also occur from killing a small number of challenging animals (such as those referred to previously as dangerous or aggressive). |

~~Iv)~~ vi) ability to communicate effectively with different audiences ~~communication skills~~;

~~vi)~~ vii) capacity to evaluate the environmental impacts caused by their operation.

1. Veterinarian
2. Responsibilities
3. advise on ~~determine~~ and supervise the implementation of the most appropriate *killing* method to ensure that animals are killed ~~without avoidable pain and distress~~ minimising pain, fear and suffering;
4. determine and implement any necessary ~~the~~ additional requirements for *animal welfare*, including the order of *killing*;
5. ensure that confirmation of the *death* of the animals is carried out by competent persons as soon as possible ~~at appropriate times~~ after the *killing* procedure;
6. minimise the risk of disease spread within and from the location or premises through the supervision of *biosecurity*;
7. ~~continuously monitor~~ ensuring *animal welfare* and *biosecurity* during killing process;
8. collaborate with the team leader on the written report at the conclusion of the *killing*.
9. Training and c~~C~~ompetencies
10. understanding of ~~ability to assess~~ *animal welfare* and ability to assess it;
11. ~~Understanding~~ knowledge of ~~especially~~ the effectiveness of the *killing* process and ~~the~~ ability to correct any deficiencies;
12. knowledge of the different killing methods and their impacts on animal welfare, and the underlying anatomy, physiological and behavioural processes involved in the killing operation.
13. ability to assess *biosecurity* risks.
14. Animal handlers
15. Responsibilities
16. review on-site facilities in terms of their appropriateness;
17. design temporary animal handling facilities, when required;
18. move and restrain animals;
19. report *animal welfare* and *biosecurity* issues to the *veterinarian*.
20. Training and c~~C~~ompetencies
21. understand the species-specific behavioural patterns of the animals they are working with and the underlying principles for carrying out the required tasks;

ii) ~~animal handling in emergency situations and in close confinement is required;~~ capable to identify signs of distress, fear, and pain and to take preventive and corrective actions;

iii) understanding of *biosecurity*.

1. Personnel in charge of killing animals
2. Responsibilities

i) k*illing* of the animals using an appropriate method;

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| Australia | **Category**: Addition  **Proposed amended text**:  i) k*illing* of the animals using an appropriate method as advised upon by the *veterinarian*;  **Rationale:**  This addition provides clarity that the “Personnel in charge of killing animals” is using the appropriate method as advised upon by the Veterinarian, and not what they feel is most appropriate. This is consistent with the previously described responsibilities of the Veterinarian. |

ii) when applicable confirm the unconsciousness of the animals;

iii) confirm the death of the animals.

1. Training and c~~C~~ompetencies
2. Safely and correctly use and maint~~e~~ain~~ance of relevant~~ equipment;
3. Operate ~~familiarity with the techniques of~~ restraining and killing equipment for the species involved;

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| Australia | **Category**: Addition  **Proposed amended text:**  ii) Ability to effectively ~~O~~operate ~~familiarity with the techniques of~~ restraining and killing equipment for the species involved;  **Rationale:**  Operators of restraining and killing equipment have to do so effectively to uphold animal welfare outcomes and work health and safety. |

**Article 7.6.6.**

**Considerations in the planning of the operations regarding the ~~mass~~** **large scale killing of animals**

Many activities will need to be conducted on affected locations or premises, including the *killing* of animals. The team leader should develop a plan and prepare for large scale *killing* of animals on the location or premises which should include consideration of:

1. minimising handling, restraint and movement of animals;
2. *killing* the animals on the affected locations or premises; however, there may be circumstances where the animals may need to be moved to another location for *killing*; when the *killing* is conducted at a *slaughterhouse/abattoir*, the recommendations in Chapter 7.5. should be followed;
3. the species, number, age and size of animals to be killed, and the order of *killing* them;
4. methods of *killing* the animals~~, and their cost~~;
5. available resources, including cost, staff numbers, and any other practical elements
6. description of the assessment of state of consciousness and signs of life;

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| Australia | **Category**: Change  **Proposed amended text**:  f) description of the process and assessment ~~of state of consciousness and signs of life~~ criteria to confirm unconsciousness and death of animals;  **Rationale**:  It is critical that, following any killing method, animals are assessed to confirm they are dead before they are moved for appropriate disposal. Hence, focussing on signs of unconsciousness and death rather than signs of life should be the priority here.  **Supporting evidence, if relevant**:  <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf> |

1. housing, husbandry, location of the animals as well as accessibility of ~~the farm or~~ the place they are situated;
2. the availability and effectiveness of equipment needed for *killing* of the animals, as well as the time necessary to kill the required number of animals using such methods;
3. the availability on the locations or premises of facilities that will be used to assist with the *killing*, and the necessity of any additional facilities;
4. potential *biosecurity* and environmental impact of the operations;
5. the health and safety of personnel conducting the *killing*;
6. ~~any legal issues that may be involved, for example where restricted veterinary drugs may be used, or where the process may impact on the environment;~~
7. ~~the presence of other nearby premises holding animals;~~
8. ~~possibilities for removal and disposal of dead animals.~~

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| Australia | **Category:** Addition  **Proposed amended text**:  k) the health and safety of personnel conducting the *killing*;  l) any legal issues that may be involved, for example where restricted veterinary drugs may be used, or where the process may impact on the environment;  m) safe removal and disposal of dead animals and any chemical or other residue.  **Rationale**:  Legal and safety should be included as considerations when planning for killing. It is important to ensure appropriate handling of dead animals and any pharmaceuticals used to avoid secondary poisoning, environmental contamination, disease transmission (e.g. including to nearby premises) or other aversive outcomes, including to non-target animals. In addition legal requirements can influence which methods of killing are feasible or best suited to specific circumstances, and should be identified early in the planning process so they do not later cause unnecessary delays in killing.  Editorial change also made, to correct the lettering of the above points.  **Supporting evidence, if relevant**:  [https://animalhealthaustralia.com.au//wp-content/uploads/dlm\_uploads/2021/12/AUSVETPLAN-\_Operational\_Disposal\_Manual.pdf](https://animalhealthaustralia.com.au/wp-content/uploads/dlm_uploads/2021/12/AUSVETPLAN-_Operational_Disposal_Manual.pdf)  <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf> |

The plan should minimise the negative animal welfare impacts of the *killing* by taking into account the different phases of the procedures to be applied for *killing*.

Competences and skills of the personnel handling and *killing* animals should be included in the operational plan.

**Article 7.6.8.**

**Measures to assess animal welfare at the time of** **killing for purposes other than slaughter**

1. The following animal-based measures can be used as the confirmation of death before carcass disposal:
2. Muscle tone

Immediately after killing, dead animals will lose muscle tone, which can be recognized from the completely relaxed legs, floppy ears, relaxed tongue and relaxed jaws.

1. Heartbeat

Onset of death leads to permanent loss of heartbeat, which can be ascertained physically by using a stethoscope or by heart or arterial palpation, where possible. [Vogel et al., 2011]

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| Australia | **Category**: Change  **Proposed amended text**:  Onset of death leads to permanent loss of heartbeat, which can be ascertained physically by using a stethoscope to auscultate the absence or presence of a heartbeat, or by ~~heart or arterial~~ palpation of the cardiac apex beat. Arterial palpitation may be used in combination with other measures where possible but should not be used alone to confirm permanent loss of a heartbeat. [Vogel et al., 2011]  **Rationale:**  Palpation for an arterial pulse on its own is not a reliable indicator to confirm the permanent loss of a heartbeat. It would be considered even less reliable in circumstances where the means of killing would result in poor blood pressure, such as bleeding methods. The current wording implies that it is an acceptable measure to confirm loss of permanent heartbeat, equivalent with cardiac auscultation or apex beat palpation. The practice of arterial pulse palpation is a specific skill that may not be practicable by all personnel involved in confirming death and is more likely to be affected by fatigue than other assessment criteria. The wording should be amended to highlight that it should not be used alone to confirm permanent loss of a heartbeat.  **Supporting evidence, if relevant:**  American Veterinary Medical Association. (2020). AVMA Guidelines for the Euthanasia of Animals: 2020 Edition. Schaumburg, IL, USA. Available at <https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf>.  Animal Health Australia (2015). *Operational manual: Destruction of animals (Version 3.2)*. Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Agriculture Ministers’ Forum, Canberra, ACT. |

1. Dilated pupils

Dilated pupils (mydriasis) are an indication of death.

Article 7.6.9.

**Handling of animals**

Handling is the process of preparation of the animals for killing, and may include moving them to the killing point. Handling and moving can be stressful to animals, especially when they are isolated out of their primary home area or from their group. [Gavinelli et al. ,2014].

1. Animal welfare concerns

Exposure to novel environments (e.g. noise, lighting, flooring, smell) may cause fear and reluctance to move, or turning back. Poorly designed facilities and inappropriate handling (e.g. inappropriate use of electrical goads, kicking, hitting with a stick) will cause *distress*, fear and *pain*.

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| Australia | **Category**: Addition  **Proposed amended text**:  Handling is the process of preparation of the animals for killing, and may include moving them to the killing point. Handling, ~~and~~ moving, and restraint can be stressful to animals, especially when they are isolated out of their primary home area or from their group. [Gavinelli et al. ,2014].   1. Animal welfare concerns   Exposure to novel environments (e.g. noise, lighting, flooring, smell) may cause fear and reluctance to move, or turning back. Poorly designed facilities and inappropriate handling (e.g. inappropriate use of electrical goads, kicking, hitting with a stick) or restraint will cause *distress*, fear and *pain*.  **Rationale:**  Inappropriate restraint can also can distress, fear, and pain to animals. |

1. Animal-based and other measures:

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| Australia | **Category:** Addition  **Proposed amended text:**  Animal-based and other measures that may be indicative of poor animal welfare:  **Rationale:**  Suggested change to provide context for the list of measures in this point |

* 1. animals slipping, falling and piling up;
  2. animals turning around or moving backwards, attempting to escape or reluctant to move;
  3. animals vocalising;
  4. animals that collide with facility structures;
  5. animals with broken or otherwise injured limbs;
  6. animals that are unable to move by themselves due to reasons other than broken or injured limbs;
  7. use of force by personnel;
  8. inappropriate use of electrical goads.

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| Australia | **Category:** Addition  **Proposed amended text**:   1. Animal-based and other measures: 2. animals slipping, falling and piling up; 3. animals turning around or moving backwards, attempting to escape or reluctant to move; 4. animals showing abnormal behaviours such as aggression, stereotypic behaviours.   ~~c~~ d) animals vocalising;  ~~d~~ e) animals that collide with facility structures;  ~~e~~ f) animals with broken or otherwise injured limbs;  ~~f~~ g) animals that are unable to move by themselves due to reasons other than broken or injured limbs;  ~~g~~ h) use of force by personnel;  ~~h~~ i) inappropriate use of electrical goads.  **Rationale:**  Animals in fear, distress or pain may show a variety of behaviours with handling. For captive wild animals, whilst individual expression varies by taxon, the underlying pattern is a deviation from normal species-typical behaviour. Aggression, stereotypic behaviour and avoidance are signs of compromised welfare in captive wildlife.  **Supporting evidence, if relevant**  Mellor, DJ., Hunt S., Gusset, M (2015). “Guidelines for the Welfare Assessment of Captive Wild Animals. **Guidelines for the Welfare Assessment of Captive Wild Animals. “World Association of Zoos and Aquariums (WAZA)** <https://www.waza.org/wp-content/uploads/2019/03/WAZA-Animal-Welfare-Strategy-2015_Portrait.pdf>  **Australian Animal Welfare Standards and Guidelines. Exhibited Animals – General NSW Department of Primary Industries. Edition 1. Published July 2019.** <https://animalwelfarestandards.net.au/wp-content/uploads/2023/08/Australian-Animal-Welfare-Standards-and-Guidelines-for-Exhibited-animals-General-.pdf> |

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| Australia | **Category**: Addition  **Proposed amended text**:  h) inappropriate use of electrical goads or other similar devices designed to inflect pain or discomfort on an animal.  **Rationale:**  Electrical goads are not the only device that may be used to increase animal compliance during handling through creation of pain or discomfort that the animal wishes to escape. The forceful use of non-electrified devices including (but not limited to) prods, sticks, batons or other similar items can lead to the same detrimental impacts on welfare as electrical goads. As such, the scope of point h) should be expanded as noted above. |

1. Recommendations

Design of the facilities should promote the natural movements of animals, and, as far as possible, minimise human interaction.

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| Australia | **Category:** Addition  **Proposed amended text**:  Design of the facilities should be appropriate for the species of concern, promote the natural movements of animals, and, as far as possible, minimise human interaction.  **Rationale:**  Additional wording to align with TAHC wording for consistency.  **Supporting evidence, if relevant**  WOAH Terrestrial Animal Health Code Chapter 7.1.5, Point 3 |

Floor should be clean, dry and not slippery.

Raceways should be well lit so that animals can see where they are going.

The design of raceways should minimise distractions that may cause animals to stop, baulk or turn back(e.g. shadows, changes in flooring, moving objects, loud or sudden noises).

Animals that are injured, sick or unable to rise require immediate action and, when necessary, emergency [*killing*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_mise_a_mort) should be performed without moving them and without delay. Animals should not be dragged, nor should they be lifted or handled in a way that might cause further [*pain*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_douleur) and suffering or exacerbate injuries.

Personnel should be calm and patient, assisting animals to move using a soft voice and slow movements.

Animals should be moved in groups as this decreases fear and makes use of their natural tendency to follow other animals.

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| Australia | **Category:** Change  **Proposed amended text**:  Animals should be moved in groups or alone, whichever is appropriate for the species, as this decreases fear and makes use of their natural species specific tendenc~~y~~ies ~~to follow other animals~~.  **Rationale:**  Not all animals prefer to be in groups- e.g. solitary wild animal species in captivity would be better handled and moved separately from other animals of the same species, to reduce stress, fear and poor welfare outcomes. |

Handling aids such as panels or flags should be used in a manner to encourage and direct movement of the animals without causing [*distress*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_detresse), fear or [*pain*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_douleur).

Electric goads should not be used routinely, but only when other measures have been ineffective, the animal has no injury or other condition and there is room for the animal to move forward.

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| Australia | **Category**: Addition  **Proposed amended text**:  Electric goads or other similar devices designed to inflict pain or discomfort on an animal to encourage it to move should not be used routinely, but only when other measures have been ineffective, the animal has no injury or other condition and there is room for the animal to move forward.  **Rationale:**  Electrical goads are not the only device that may be used to increase animal compliance during handling through creation of pain or discomfort that the animal wishes to escape. The forceful use of non-electrified devices including (but not limited to) prods, sticks, batons or other similar items can lead to the same detrimental impacts on welfare as electrical goads. As such, the scope should be expanded as noted above. |

Only low-voltage goads should be applied to the hindquarters of adult pigs and large ruminants, and never to sensitive areas such as the eyes, mouth, ears, ano-genital region, udders or belly. Such instruments should not be used on equids, camelids, ratites, sheep and goats, pregnant animals or on calves or piglets. Shocks should not be used repeatedly if the animal fails to respond and should not last longer than one second.

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| Australia | **Category:** Change  **Proposed amended text**  ~~Only~~The use of goads should be limited to low-voltage goads ~~should be~~ applied to the hindquarters of adult pigs and large ruminants, and never to sensitive areas such as the eyes, mouth, ears, ano-genital region, udders or belly. Such instruments should not be used on equids, camelids, ratites, sheep and goats, pregnant animals or on calves or piglets. Shocks should not be used repeatedly if the animal fails to respond and should not last longer than one second.  **Rationale:**  Suggested change for clarity, and to align with meaning outlined in Chapter 7.5. Current wording could be misinterpreted as saying low voltage goads are restricted to use on hindquarters of pigs and cattle, but other voltage goads could therefore be used for other situations (e.g. on other regions of the body, or on other species of animal). |

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| Australia | **Category:** Change  **Proposed amended text**:  Handling aids such as panels or flags should be used in a manner to encourage and direct movement of the animals without causing [*distress*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_detresse), fear or [*pain*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_douleur).  Handling aids should never be used on sensitive areas such as the eyes, mouth, ears, ano-genital region, udders or belly.  Electric goads should not be used routinely, but only when other measures have been ineffective, the animal has no injury or other condition and there is room for the animal to move forward.  Only low-voltage goads should be applied to the hindquarters of adult pigs and large ruminants~~, and never to sensitive areas such as the eyes, mouth, ears, ano-genital region, udders or belly.~~ Such instruments should not be used on equids, camelids, ratites, sheep and goats, pregnant animals or on calves or piglets. Shocks should not be used repeatedly if the animal fails to respond and should not last longer than one second.  **Rationale:**  The principle of avoiding the use of goads to sensitive areas applies to all animals, not just adult pigs and large ruminants. This should be included as a separate point. |

The manual lifting of animals should be avoided; if it is necessary, animals should not be grasped or lifted in a manner which causes [*pain*](https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/index.php?id=169&L=1&htmfile=glossaire.htm#terme_douleur) or suffering and physical damage (e.g. bruising, fractures, dislocations).

Animals should not be forced to move at a speed greater than their normal walking pace to minimise injury through slipping or falling.

Article 7.6.10.

**Killing Methods**

The following killing methods are globally available and in use. The main purpose of this part of the chapter is to ensure that where killing methods are in use that they are undertaken in a manner that optimises animal welfare.

For each killing method the description of the killing method and its use in animal species, animal welfare concerns, identification of animal-based and other welfare measures, recommendations for effective use to optimise welfare, and any species-specific recommendations are presented in Articles 7.6.11. to 7.6.32.

Standard operating procedures should be in place that define key operating parameters and follow the manufacturer's recommendations for stunning or killing.

The killing methods covered are divided into two broad categories. Manual, individual killing methods which involve a human operator or operators manually performing a killing procedure on individual animals (Articles 7.6.11. to 7.6.22.); and automated large scale killing methods which involve automated procedures for large scale killing of many animals either sequentially (e.g. water baths) or simultaneously (e.g. atmospheric modification) (Articles 7.6.23. to 7.6.32).

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| Australia | **Category:** General  **Proposed amended text**:  For the purposes of this chapter:  Primary killing method is a method intended to cause death as a standalone procedure. While it should be sufficient on its own, a backup or alternative method may be required if the primary method fails to result in rapid death.  Secondary killing method is a method used as a final step of a two-stage process. It is applied after the animal has already been made unconscious by an initial method. The secondary method is considered a terminal procedure. While it should be sufficient on its own to cause rapid death of an animal, a backup or alternative method may be required if the method fails to result in rapid death.  **Rationale:**  To improve clarity and consistency it is recommended that the term ‘secondary killing method' or similar be defined in this article. It is also recommended that WOAH review the entire chapter to ensure consistency.  For example - pithing is defined as a ‘*secondary method of killing animals which have been stunned by a penetrating captive bolt, without immediate death’.* However, in article 7.6.14, it is referred to more generally as a secondary intervention *– ‘a secondary intervention such as pithing, bleeding or lethal injection’.*  While bleeding is considered a secondary intervention in article 7.6.14, in article 7.6.15 it is not defined as a secondary intervention or method. The article does state that ‘*bleeding may be painful if that animal has not been rendered unconscious prior to procedure’*. |

Article 7.6.11.

**Firearms**

Firearms that fire free projectiles such as a shotgun, rifle, or handgun can provide a quick and effective method for killing when used properly. They require minimal or no restraint and can be used to kill from a distance by properly trained and competent marksmen or markswomen.

A firearm can be used from long range and may be aimed to penetrate the skull or soft tissue at the top of the neck of the animals (high neck shot) and to cause irreversible concussion and death and should only be used by properly trained and competent marksmen. The firearm may also be aimed to penetrate the thoracic cavity and heart causing respiratory and heart failure and death.

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| Australia | **Category:** Change  **Proposed amended text:**  When performed correctly this method is a one-stage procedure causing immediate loss of consciousness and death. Firearms that fire free projectiles such as a shotgun, rifle, or handgun can provide a quick and effective method for killing when used properly. They require minimal or no restraint and can be used to kill from a distance by properly trained and competent ~~marksmen or markswomen~~ licensed firearm user. If used at a long range, they ~~A firearm can be used from long range and~~ may be aimed to penetrate the skull or soft tissue at the top of the neck of the animals (high neck shot) andto cause irreversible concussion and death~~. and should only be used by properly trained and competent marksmen.~~ ~~The firearm may also be aimed to penetrate the thoracic cavity and heart causing respiratory and heart failure and death.~~ When used at short range, they should be aimed to penetrate the skull and cause irreversible concussion and death, similar to use of a penetrating captive bolt. Heart and lung shots should only be considered when the accuracy required for a brain shot cannot be achieved.  Killing by firearm should only be performed by properly trained and competent licensed firearm user.  **Rationale:**  Edited for clarity. Additional information should also be included regarding the use of firearms for killing at short ranges.  Cardiac and thoracic cavity shots cause severe tissue trauma and haemorrhage, leading to unnecessary pain and suffering for the animal. Time to unconsciousness can range from seconds to minutes (possibly longer). It also has a higher chance of non-lethal wounding. These types of shots would not be considered appropriate in the context of animal welfare where controlled conditions allow access to head shots that have higher reliability of causing immediate loss of brain activity and sensibility.  The AUSVETPLAN Operating Manual: Destruction of Animals advises that heart or lung shots should only be considered where the accuracy required for a brain shot cannot be achieved. For example, when aerial shooting or shooting over long distances, or where there are human safety, animal disease or diagnostic considerations.  Licensed firearm user is a gender neutral term and consistent with the rest of the paragraph.  Removal of high neck shot – While a high neck shot will achieve incapacitation of the animal it is unlikely to result in a rapid progression to insensibility and therefore should not be suggested as a humane method of killing.  **Supporting evidence, if relevant:**  Animal Health Australia (2015). Operational manual: Destruction of animals (Version 3.2). Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Agriculture Ministers’ Forum, Canberra, ACT.  Blackmore DK, Daly CC, Cook CJ. Electroencephalographic studies on the nape shooting of sheep. N Z Vet J. 1995;43(4):160-163. doi:10.1080/00480169.1995.35879 |

1. Animal Welfare Concerns

This method has the potential for non-lethal wounding of the target animal and lethal or non-lethal wounding of non-target animals. This may occur because of inappropriate cartridge, calibre or type of bullet or incorrect shooting position.

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| Australia | **Category:** Addition  **Proposed amended text:**  A one-stage killing procedure risks distress, fear, and pain if the animal has not been immediately or rapidly rendered unconscious in the procedure. This method has the potential for non-lethal wounding of the target animal and lethal or non-lethal wounding of non-target animals. This may occur because of inappropriate cartridge, calibre or type of bullet, ~~or~~ incorrect shooting position or inadequate restraint/control of target and non-target animals.  In the case of ineffective killing, the method should be repeated, or animals should be killed using a backup system such as *(specify backup method).*  **Rationale:**  Inadequate control of the target animal or non-target animals (e.g. that may wander close to or into the line of the shot) may result in similar issues.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method. |

1. Animal-based and other measures

Animal-based measures of an effective shot include [HSA, 2016b]:

1. immediate collapse
2. apnoea
3. carcass appearance (tonic or relaxed)
4. duration of convulsions
5. absence of eye movement
6. glazed expression
7. absence of corneal reflex
8. Recommendations

Firearms and ammunition should be selected based on the species and the distance to shoot the animals. The correct cartridge, calibre and type of bullet for the different species age and size should be used.

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| Australia | **Category:** Addition  **Proposed amended text:**  Firearms and ammunition should be selected based on the species and the distance to shoot the animals, and expert advice should be sought where possible, and/or if in doubt, erring towards a more powerful charge. The correct cartridge, calibre and type of bullet for the different species age and size should be used.  **Rationale:**  Incorrect selection of firearms and ammunition can negatively impact animal welfare (as well as pose significant risks to people and other animals) and expert advice should be sought to ensure this is adequately addressed. |

Firearms are suitable for killing agitated animals in open spaces.

Firearms should not be used if trying to preserve brain tissue for diagnosis of diseases or when leakage of body fluids may present a biosecurity risk.

Training is essential for ensuring effective killing with firearms. This training must include approaches that ensure skilled marksmanship; an understanding of safety principles, animal anatomy, animal behaviour; animal handling; use of appropriate combinations of firearms and bullets for the intended purpose; and appropriate judgment under field conditions.

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| Australia | **Category:** Addition  **Proposed amended text:**  Training is essential for ensuring effective killing with firearms. This training must include approaches that ensure skilled marksmanship; an understanding of safety principles, animal anatomy, animal behaviour; animal handling; use of appropriate combinations of firearms and bullets for the intended purpose; and appropriate judgment under field conditions.  To enable maximum impact and accuracy, the range should be as short as circumstances permit.  **Rationale:**  Minimising distance as appropriate to the circumstances may help avoid missing the target animal, wounding of other animals and risks to people, and maximise the impact. |

At short range, the marksman or markswoman should ensure that the animal is not moving and in the correct position to enable accurate targeting and the range should be as short as possible (5–50 cm for a shotgun) but the barrel should not be in contact with the head or other part of the animals.

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| Australia | **Category**: Change  **Proposed amended text**:  At short range, the ~~marksman or markswoman~~ licensed firearm user should ensure that the animal is not moving and in the correct position to enable accurate targeting and the range should be as short as possible (5–50 cm for a shotgun) but the barrel should not be in contact with the head or other part of the animals.  **Rationale:**  Gender-neutral and consistent with term used earlier in text. |

Animals that are not killed by the initial shot, should be re-shot or killed by a backup method.

The method is suitable for all species covered by this chapter.

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| Australia | **Category:** Addition  **Proposed amended text:**  The method is suitable for many but not all species covered by this chapter. Some species may only be suited for killing by firearm by certain techniques (thoracic vs cranial), or as a last resort if more suitable alternatives are not available.  Sedation of the animals prior to killing may allow more consistent outcomes, and may be feasible for smaller groups of animals. Use of tranquilliser darts followed by a secondary method of killing performed at closer range may also reduce the welfare risk to the target animal, as well as the risk to people and other animals in the area.  **Rationale:**  The chapter scope has been revised to include all mammals and birds. Not all methods are suitable for all species – e.g. long range use or aiming to penetrate the skull of small mammals (e.g. farmed mink) or birds may not be feasible, or may not offer the same level of welfare as other methods and should only be used as a last resort.  Sedation prior to killing, particularly with flighty animals or animals that may otherwise move around, may assist with ensuring an accurate and effective shot. |

1. Species-specific recommendations

None identified

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| Australia | **Category:** General  **Proposed amended text:**   1. Species-specific recommendations   ~~None identified~~  Use of a firearm for killing should consider differences in brain position and skull conformation between species. In addition, aged animals have harder skulls, and the sex of the animal can impact the choice of firearm.  **Rationale:**  As a general comment, we recommend that practical advice (e.g. exact details on positioning and directing shots) accompanied by diagrams relevant to the different species should be included - particularly as the scope of the chapter has expanded to include all mammals and birds. For example, shooting of horned animals at close range with the aim of penetrating the skull will require different aiming/placement than for non-horned animals of the same species.  **Supporting evidence, if relevant**  Further examples can be found in literature including:  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_  Australian Animal Welfare Standards and Guidelines and industry codes of practice, available at https://animalwelfarestandards.net.au/  AVMA Guidelines for the Depopulation of Animals: 2019 Edition  EFSA Journal articles on killing for purposes other than slaughter for horses, poultry, sheep and goats, cattle, pigs and other species – available at <https://www.efsa.europa.eu/en/search?s=&f%5B0%5D=topic%3A363>  Humane Slaughter Association (UK) guidelines including humane killing of livestock using firearms, emergency slaughter, and on-farm killing for disease control purposes, available at <https://www.hsa.org.uk/publications/online-guides> |

Article 7.6.12.

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| Australia | **Category:** General  **Comment:** As with article 7.6.11, we recommend that practical advice (such as diagrams indicating best positioning and aiming of captive bolt devices) be included, particularly as the scope of the chapter has expanded to include all mammals and birds.  **Supporting evidence, if relevant**  Further examples can be found in literature including:  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_  Australian Animal Welfare Standards and Guidelines and industry codes of practice, available at https://animalwelfarestandards.net.au/  EFSA Journal articles on killing for purposes other than slaughter for horses, poultry, sheep and goats, cattle, pigs and other species – available at <https://www.efsa.europa.eu/en/search?s=&f%5B0%5D=topic%3A363>  Humane Slaughter Association (UK) guidelines including humane killing of livestock using firearms, emergency slaughter, and on-farm killing for disease control purposes, available at <https://www.hsa.org.uk/publications/online-guides>  AVMA Humane Slaughter Guidelines 2024, available at https://www.avma.org/stes/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf |

**Penetrating captive bolt**

The aim of this method is to produce a state of unconsciousness and cause severe damage to the brain by the impact and penetration of a captive bolt using a mechanical device. The captive bolt should be positioned on the skull to penetrate the cortex and mid-brain of the animal. The force of impact and the physical damage caused by the passage of the bolt should result in immediate unconsciousness. Physical damage to the brain caused by penetration of the bolt may result in death; however, a secondary intervention such as pithing, bleeding or lethal injection should be performed as soon as possible after the shot to ensure the death of the animal.

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| Australia | **Category:** Addition  **Proposed amended text:**  This method is suitable for equids, camelids, cattle, sheep, goats, pigs, poultry, ratites, rabbits, and certain captive wild animals.  The aim of this method is to produce a state of unconsciousness and cause severe damage to the brain by the impact and penetration of a captive bolt using a mechanical device. To be effective, captive bolt devices must be positioned correctly and held firmly against the skull, with the animal adequately restrained.The captive bolt should be positioned on the skull to penetrate the cortex and mid-brain of the animal. The force of impact and the physical damage caused by the passage of the bolt should result in immediate unconsciousness. Physical damage to the brain caused by penetration of the bolt may result in death; however, a secondary killing method ~~intervention~~ such as pithing, bleeding or lethal injection should be performed as soon as possible, and without delay, after the shot to ensure the death of the animal. Animals that are not rendered unconscious by the initial shot, should be immediately re-shot or killed by the secondary killing method or other backup method.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Given the importance of appropriate placement of the captive bolt for effective stunning and to maximise animal welfare outcomes, we recommend highlighting the requirements of both appropriate positioning and adequate restraint of the animal.  Intervention has been replaced with “killing method’ for clarity and consistency with description as intervention used elsewhere for non-terminal methods  “And without delay” added to emphasise requirement to undertake terminal procedure post- stun immediately  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method.  **Supporting evidence, if relevant**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_ |

A penetrating captive bolt is fired from a gun powered by either compressed air or a blank cartridge, designed to fire a retractable metal bolt into the animal’s cranium. The bolt should be recessed into the body of the pistol to get the proper velocity required to penetrate the skull of the animal.

1. Animal welfare concerns

An incorrect shooting position or incorrect captive bolt parameters (not hitting the skull with sufficient force) will mis-stun the animal, leaving it conscious and leading to serious wounds and consequently distress, fear and pain.

Regaining of consciousness before death due to delay in applying the secondary intervention.

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| Australia | **Category**: Addition  **Proposed amended text:**  Animal welfare concerns  An incorrect shooting position or incorrect captive bolt parameters (not hitting the skull with sufficient force) will mis-stun the animal, leaving it conscious and leading to serious wounds and consequently distress, fear and pain.  Restraint of the animal is required.  Regaining of consciousness before death due to delay in applying the secondary ~~intervention~~ killing method.  **Rationale:**  Restraint of the animal for penetrative captive bolt is required which can impact animal welfare. ‘killing method’ used rather than intervention as above.  **Supporting evidence, if relevant**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_ |

1. Animal-based and other measures

Animal-based measures of an effective shot include:

1. immediate collapse
2. apnoea
3. tonic seizures
4. absence of eye movement
5. absence of corneal reflex
6. absence of palpebral reflex
7. absence of righting reflex

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| Australia | **Category** Addition  **Proposed amended text**:   1. Animal-based and other measures   Animal-based measures of an effective shot include:   1. immediate collapse 2. apnoea/ no rhythmic breathing 3. ~~tonic seizures~~ initial tonic reaction then clonic activity 4. absence of eye movement 5. absence of corneal reflex 6. absence of palpebral reflex 7. absence of righting reflex 8. jaw and tongue are loose   **Rationale:**  Additional animal-based methods listed for completeness  **Supporting evidence, if relevant**  ESCAS ANIMAL WELFARE STANDARDS available at https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/livestock/exporters/escas#animal-welfare |

1. Recommendations

For cartridge powered and compressed air guns, the bolt velocity and the length of the bolt should be appropriate to the species and type of animal, in accordance with the recommendations of the manufacturer.

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| Australia | **Category:** Change  **Proposed amended text**:  Recommendations  For cartridge powered and compressed air guns, it is important to ensure that the correct type of captive bolt, bolt length and propulsive power is matched to the species and type of animal being destroyed ~~the bolt velocity and the length of the bolt should be appropriate to the species and type of animal, in accordance with the recommendations of the manufacturer.~~ Operators should ensure that they follow manufacturer's instructions and that they match the correct stunning devices and cartridges (where applicable) with the specific species, type and age of animals being treated.  **Rationale:**  Edited to include more detail on characteristics of captive bolt to be utilised and more detail on expectations of operators decision-making processes**.** |

Captive bolt guns should be frequently cleaned and maintained in good working condition. Regular check-up of the bolt velocity is recommended for effective stunning, operator safety, and improved animal welfare.

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| Australia | **Category** Addition  **Proposed amended text**:  Captive bolt guns should be frequently cleaned and maintained in good working condition. Regular check-up (e.g. daily during ongoing use) of the bolt velocity is recommended for effective stunning, operator safety, and improved animal welfare.  **Rationale:**  Given the importance of captive bolt gun velocity in effective stunning, “daily” has been added to the velocity check to add a specific time frame around the regular checks.  **Supporting evidence, if relevant**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_ |

More than one gun may be necessary to avoid overheating with repeated use, and a back-up gun should be available in the event of an ineffective shot.

Animals should be restrained and the operator should ensure that the head of the animal is accessible. The method is difficult to apply in agitated animals.

Proper positioning of the captive bolt equipment is required as incorrect positioning causes inefficient stunning leading to pain and distress in animals.

Animal-based measures should be monitored continuously after application until *death* to ensure the absence of brain stem reflexes.

Suitable training and experience of operators in the application of captive bolt pistol, ergonomics and workload conditions should be considered for reducing fatigue in operators.

Penetrating captive bolt should not be used if preservation of brain tissue for diagnosis of diseases or when leakage of body fluids may present a biosecurity risk.

The secondary intervention should be performed without delay after the shot to ensure the death of the animal.

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| Australia | **Category:** Editorial  **Proposed amended text**:  The secondary ~~intervention~~ killing method should be performed as soon as possible and without delay after the shot to ensure the death of the animal  **Rationale:**  Edited for clarity and consistency |

The method is suitable for equids, camelids, cattle, sheep, goats, pigs, poultry, ratites, rabbits and *captive wild animals*.

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~The method is suitable for equids, camelids, cattle, sheep, goats, pigs, poultry, ratites, rabbits and~~ *~~captive wild animals~~*~~.~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

The size of the skulls and the thickness of the skull bones should be taken into account when selecting parameters such as bolt diameter, bolt length and cartridge power in penetrative captive bolt stunning.

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| Australia | **Category:** Addition  **Proposed amended text**:  The size of the skulls and the thickness of the skull bones should be taken into account when selecting parameters such as bolt diameter, bolt length and cartridge power in penetrative captive bolt stunning. It is essential to follow the manufacturer’s recommendations for the most appropriate cartridges for different animals. If there is doubt, a more powerful charge should be used.  **Rationale:**  Additional information to ensure correct penetrative bolt is used for each animal and to recommend manufacturer information.  **Supporting evidence, if relevant:**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_ |

Heavily horned animals should be stunned with penetrative captive bolt in the occipital position using a heavy-duty contact-fired captive bolt gun directed forward at the nose.

In new world camelids the device should be placed at the crown position (highest point on the head) aiming downward to the base of the jaw [AVMA, 2020].

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| Australia | **Category:** Change  **Proposed amended text**:  In new world camelids the device should be placed at the midline on the crown of the head ~~the crown position~~ (highest point on the head) aiming downward to the base of the jaw ~~[AVMA, 2020].~~  **Rationale:**  Update to reflect 2024 AVMA guideline for camelid captive bolt stunning  **Supporting evidence, if relevant**  AVMA Humane Slaughter Guidelines 2024, available at https://www.avma.org/sites/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf |

In turkeys 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.

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.

In ratites a device with 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.

Article 7.6.13.

**Pithing**

Pithing is not a standalone killing or stunning method, it’s a secondary method of *killing* animals which have been stunned by a penetrating captive bolt, without immediate *death*.

Pithing physically disrupts the central nervous system by the insertion of a flexible rod. The rod can be inserted caudally through the brain stem and spinal cord following stunning by penetrative captive bolt or cranially through the spinal cord and brain stem following decapitation. Pithing can be used as a primary killing method for animals which have been stunned by a penetrating captive bolt, without immediate death or as a secondary method to ensure rapid death.

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| Australia | **Category:** Change  **Proposed amended text**:  **Pithing**  Pithing is not a primary method of killing~~, standalone killing or stunning method~~.  Pithing ~~it’s~~ is a secondary, ~~method of~~ killing method *~~killing~~*for animals which have been rendered unconscious by stunning with a penetrating captive bolt. ~~have been stunned by a penetrating captive bolt, without immediate~~ *~~death~~*~~.~~  Pithing ~~physically disrupts~~ manually destroys the brain tissue in and around the brainstem to ensure death.  ~~the central nervous system by the insertion of a~~ A flexible rod~~. The rod~~ can be inserted through the hole made in the animal’s skull by a projectile (for example, by a penetrating captive bolt) and directing the rod caudally through the brain stem and spinal cord. ~~following stunning by penetrative captive bolt or~~ Alternatively, the rod can be directed cranially through the spinal cord and brain stem following decapitation. The brain and spinal cord is macerated by moving the rod up and down several times.  ~~Pithing can be used as a primary killing method for animals which have been stunned by a penetrating captive bolt, without immediate death or as a secondary method to ensure rapid death.~~  **Rationale:**  Wording changes recommended for consistent terminology and language within the WOAH Chapter.  The statement “pithing can be used as a primary killing method for animals which have been stunned…” may cause confusion for readers and may be misinterpreted. As pithing is a secondary killing method or terminal procedure that should only ever be performed on unconscious/stunned animals, this wording/messaging should be kept consistent throughout the article/chapter.  **Supporting evidence, if relevant**  *Secondary killing method referenced from*:   * Gibson, T. J., Mason, C.W., Spence, J.Y., Barker, H. and Gregory, N.G., 2015. Factors Affecting Penetrating Captive Bolt Gun Performance. *Journal of Applies Animal Welfare Science*, 18, pp. 222-238 * AVMA Guidelines for the Depopulation of Animals: 2019 Edition. <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf>. Accessed 12 May 2025 * Hewitt, L. and Small, A., 2021. An independent animal welfare assessment of mass destruction methods for pigs on-farm. [An independent animal welfare assessment of mass destruction methods for pigs on-farm](https://www.agriculture.gov.au/sites/default/files/documents/independent-animal-welfare-assessment-mass-destruction-methods-pigs-on-farm.pdf). Accessed 12 May 2025.   *Pithing technique referenced from*:   * Shearer, J.K, 2018, Euthanasia of Cattle: Practical Considerations and Applications. *Animals*, 8 (57), pp. 1-17.   *Decapitation is mentioned in:*   * EFSA Panel on Animal Health and Welfare (AHAW), 2019. Killing for purposes other than slaughter: poultry. <https://www.efsa.europa.eu/en/efsajournal/pub/5850>. Accessed 12 May 2025 * WOAH Killing of reptiles for their skins, meat and other products. [chapitre\_aw\_reptiles.pdf](https://www.woah.org/fileadmin/Home/eng/Health_standards/tahc/current/chapitre_aw_reptiles.pdf). Accessed 12 May. |

1. Animal welfare concerns

Since pithing is not a killing method, but rather an adjunct method, it doesn’t have any welfare concerns of its own. However, it shares the welfare concerns of the primary method of killing or stunning.

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| Australia | **Category**: Change  **Proposed amended text**:  Since pithing is not a primary method of killing, but rather a~~n~~ secondary, terminal technique ~~adjunct method~~, it doesn’t have any welfare concerns of its own when applied to an insensible animal. However, it shares the welfare concerns of the primary method of killing or stunning.  **Rationale:**  Wording changes recommended for consistent terminology and language throughout article and chapter for follow up procedures to ensure effective killing post stunning.  The lack of welfare concern as a result of pithing is only when the animal is already insensible from effective stunning |

1. Animal-based and other measures

Absence of brain stem reflexes and other muscle movements (following initial violent muscle contractions) can be used to confirm successful pithing.

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Absence of brain stem reflexes and other muscle movements (following initial violent muscle contractions) can be used to confirm successful pithing.~~  Successful pithing can be confirmed by:   * Sustained absence of breathing * Sustained absence of response to corneal or palpebral stimuli * Dilated pupils * Relaxed body – lack of righting reflex, body movement and muscle tone, ~~brain stem reflexes and other muscle movements~~ (~~following~~ noting that the initial ~~violent muscle contractions)~~ movements of the animal’s head and legs can be violent. ~~can be used to confirm successful pithing.~~   Heartbeat may continue for several minutes after effective pithing, and therefore, other indicators such as dilated pupils and absence of breathing may be used to assess the outcome immediately after pithing.  **Rationale:**  Wording changes recommended for consistent terminology and language within the WOAH Chapter.  **Supporting evidence, if relevant:**  Reference for confirmation of death and reference to heartbeat monitoring:   * EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of cattle during killing for purposes other than slaughter. [EFSA Journal - 2020 - - Welfare of cattle during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202020%20-%20%20-%20Welfare%20of%20cattle%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025. |

1. Recommendations

Pithing is an adjunct method that can be used in conjunction with penetrative captive bolt stunning or decapitation to ensure that an animal is dead (in the case of penetrative captive bolt stunning) or that an animal is no longer conscious (in the case of decapitation).

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| Australia | **Category**: Change  **Proposed amended text**:  3. Recommendations  Pithing is a~~n~~ ~~adjunct~~ secondary, terminal killing technique ~~method~~ that can be used in conjunction with penetrative captive bolt stunning~~, firearm~~ use or decapitation to ensure that an animal is dead ~~(in the case of penetrative captive bolt stunning) or that an animal is no longer conscious (in the case of decapitation)~~.  Pithing should not be used if trying to preserve brain tissue for diagnosis of diseases or when leakage of body fluids may present a biosecurity risk.  Some pithing rods have a sponge to absorb body fluids and use barbs to remain inside the skull thereby preventing removal or slippage of the rod following insertion.  The pithing process can be dangerous as it may stimulate violent involuntary movements of the animal’s legs and head.  **Rationale:**  Wording adjustment to maintain consistency across the article/chapter and emphasise that pithing is a secondary intervention. Pithing should only ever be performed on unconscious/stunned animals. The last part of the sentence should be deleted as it indicates that it is appropriate to perform pithing on a conscious animal and is misleading to readers.  As with firearms or use of penetrative captive bolts, pithing damages the brain/neural tissue and may cause contamination of the surrounding area.  **Supporting evidence, if relevant:**  Animal Health Australia (2015). Operational manual: Destruction of animals (Version 3.2). Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Agriculture Ministers’ Forum, Canberra, ACT.  *References for rod use*:  Appelt, M. and Sperry, J., 2007. Stunning and killing cattle humanely and reliably in emergency situations — A comparison between a stunning-only and a stunning and pithing protocol. *Canadian Veterinary Journal*, 48, pp. 529-534.  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of cattle during killing for purposes other than slaughter. [EFSA Journal - 2020 - -Welfare of cattle during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202020%20-%20%20-%20Welfare%20of%20cattle%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of sheep and goats during killing for purposes other than slaughter. [EFSA Journal - 2024 - - Welfare of sheep and goats during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202024%20-%20%20-%20Welfare%20of%20sheep%20and%20goats%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025. |

1. Species-specific recommendations

The pithing rod selected must be of a suitable size to be able to fit within the spinal canal of the animal.

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| Australia | **Category:** Addition  **Proposed amended text:**  Stunning should be followed as quickly as possible (without any delay) by destruction of the brain and upper spinal cord by pithing to prevent recovery of consciousness.  The pithing rod selected must be of a suitable size to be able to fit within the spinal canal of the animal.  **Rationale:**  Wording changes recommended for consistent terminology and language within the WOAH Chapter.  **Supporting evidence, if relevant:**  *Reference for confirmation of death:*  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of cattle during killing for purposes other than slaughter. [EFSA Journal - 2020 - -Welfare of cattle during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202020%20-%20%20-%20Welfare%20of%20cattle%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of sheep and goats during killing for purposes other than slaughter. [EFSA Journal - 2024 - - Welfare of sheep and goats during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202024%20-%20%20-%20Welfare%20of%20sheep%20and%20goats%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025. |

Article 7.6.14.

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| Australia | **Category:** General  **Comment:** We recommend that additional guidance be provided in this section, regarding the appropriate positioning of non-penetrating captive bolt devices for other species.  **Rationale:**  Additional guidance will help ensure animal welfare outcomes are met. |

**Non-penetrating captive bolt** **followed by a secondary killing method**

Non‐penetrating captive bolt have a ‘mushroom headed bolt" which impacts the skull but does not enter the brain. It administers a blow to the animal’s skull of sufficient force to render the animal immediately unconscious. The gun should be placed on the front of the skull to deliver a percussive blow which produces instantaneous unconsciousness. A secondary intervention such as bleeding, cervical dislocation or lethal injection should be performed without delay after the shot to ensure the death of the animal.

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| Australia | **Category:** Change  **Proposed amended text**:  **Non-penetrating captive bolt ~~followed by a secondary killing method~~**  This method is suitable for turkeys, chickens, ratites, rabbits, lambs, and goat kids (approximately up to 4.5 kg) and piglets (approximately up to 10.9 kg).  Non‐penetrating captive bolt devices have a ‘mushroom headed bolt" which impacts the skull but does not enter the brain. It administers a blow to the animal’s skull of sufficient force to render the animal immediately unconscious. The gun should be placed on the front of the skull to deliver a percussive blow which produces instantaneous unconsciousness. A secondary ~~intervention~~ killing method such as bleeding, cervical dislocation or lethal injection ~~should~~ must be performed without delay after the shot to ensure the death of the animal.  **Rationale:**  Deletion in heading for consistency with other articles on stunning methods.  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Given the importance of this step and the welfare issues that arise should the animal regain consciousness, we recommend this is described as ‘must’.  Other changes made for consistency in language use throughout the chapter |

1. Animal welfare concerns

An incorrect shooting position or incorrect captive bolt parameters (not hitting the skull with sufficient force) will mis-stun the animal, leaving it conscious and leading to serious wounds and consequently distress, fear and pain.

Regaining of consciousness before death due to delay in applying the secondary intervention.

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| Australia | **Category:** Editorial  **Proposed amended text**:  Regaining of consciousness before death due to delay in applying the secondary ~~intervention~~ killing method.  **Rationale:**  Consistency in language use throughout the chapter |

1. Animal-based and other measures

Animal-based measures of an effective shot include:

1. immediate collapse
2. apnoea
3. tonic seizures
4. absence of eye movement
5. absence of corneal reflex
6. absence of palpebral reflex
7. absence of righting reflex
8. Recommendations

For cartridge powered and compressed air guns, the velocity and diameter of the bolt should be appropriate to the species and type of animal, in accordance with the recommendations of the manufacturer.

Non-penetrating captive bolt guns should be frequently cleaned and maintained in good working condition. Regular check-up of the bolt velocity is recommended for effective stunning, operator safety, and improved animal welfare.

More than one gun may be necessary to avoid overheating, and a back-up gun should be available in the event of an ineffective shot.

Animals should be restrained and the operator should ensure that the head of the animal is accessible. The method is difficult to apply in agitated animals.

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| Australia | **Category:** Deletion  **Proposed amended text**:  Animals should be restrained and the operator should ensure that the head of the animal is accessible. ~~The method is difficult to apply in agitated animals.~~  **Rationale**:  The text ‘The method is difficult to apply in agitated animals’ in this article and in Article 7.6.12 should be moved to a more suitable section (e.g. Animal welfare concerns) unless it is accompanied by a recommendation around its use/avoidance with agitated animals. |

Proper positioning of the non-penetrating captive bolt equipment is required as incorrect positioning of the captive bolt causes inefficient stunning leading to pain and distress in animals.

Animal-based measures should be monitored continuously after application until death to ensure the absence of brain stem reflexes.

Suitable training and experience of operators in the application of non-penetrating captive bolt pistol and ergonomics and workload conditions should be considered for reducing fatigue in operators.

The secondary intervention should be performed without delay after the shot to ensure the death of the animal.

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| Australia | **Category:** Change  **Proposed amended text**:  The secondary intervention ~~should~~ must be performed without delay after the shot to ensure the death of the animal.  **Rationale:**  Given the importance of this step we recommend this is described as ‘must’ |

This methods is suitable for turkeys, chickens, ratites, rabbits, lambs and goats kids ( approximately up to 4.5 kg) and piglets (approximately up to 10.9 kg).

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~This methods is suitable for turkeys, chickens, ratites, rabbits, lambs and goats kids ( approximately up to 4.5 kg) and piglets (approximately up to 10.9 kg).~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

In turkeys 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.

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.

In ratites a device with 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.

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.

In lambs and goats kids up to approximately 4.5 kg the preferred shooting position is with the muzzle of the non-penetrating captive bolt on the midline behind the poll (e.g., between the ears) with the chin tucked into the neck.

In piglets, non-penetrative captive bolt provides immediate and irreversible loss of consciousness and brain death in piglets up to 10.9 kg with a single application on the frontal–parietal position [Grist et al., 2017, 2018a].

Article 7.6.15.

**Bleeding**

Bleeding is a method of *killing* animals through the severance of the major blood vessels in the neck or chest that results in a rapid fall in blood pressure, leading to cerebral ischaemia and *death*.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for all animals covered by this chapter. Bleeding is a method of *killing* animals through the severance of the major blood vessels in the neck or chest that results in a rapid fall in blood pressure, leading to cerebral ischaemia and *death*. Bleeding is a terminal procedure causing death but is not acceptable as a primary method of non slaughter killing and should be performed only after a primary intervention and once an animal has lost consciousness.  **Rationale:**  Added for clarity about use of bleeding as a secondary killing method only in non slaughter killing given the trauma, pain and distress this procedure has the potential to cause.  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Animal welfare concerns

The process of *bleeding* requires significant tissue trauma and this may be painful if the animal has not been rendered unconscious prior to the procedure [Gibson et al. 2009]. Consciousness may persist for periods of up to 20 or 60 seconds (depending on species) following blood vessel transection [Johnson et al. 2015]. Animals may experience fear, pain and *distress* during this period.

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| Australia | **Category:** Change  **Proposed amended text**:  The process of *bleeding* requires significant tissue trauma and this ~~may~~ is likely to be painful if the animal has not been rendered unconscious prior to the procedure [Gibson et al. 2009]. Consciousness may persist for periods of up to 20 or 60 seconds (depending on species) following blood vessel transection [Johnson et al. 2015]. Animals may experience fear, pain and *distress* during this period.  **Rationale:**  **“**Likely” is more appropriate as it reflects the weight of the evidence.  **Supporting evidence, if relevant:**  TJ Gibson, CB Johnson, JC Murrell, CM Hulls, SL Mitchinson, KJ Stafford, AC Johnstone and DJ Mellor (2009). Electroencephalographic responses of calves to slaughter by ventral neck incision without prior stunning. New Zealand Veterinary Journal 57 77-83. | |
| Australia | | **Category:** Addition  **Proposed amended text**:  The process of *bleeding* requires significant tissue trauma and this may be painful if the animal has not been rendered unconscious prior to the procedure [Gibson et al. 2009]. Consciousness may persist for periods of up to 20 or 60 seconds (depending on species) following blood vessel transection [Johnson et al. 2015]. Animals may experience fear, anxiety associated with extreme hypovolaemia, pain and *distress* during this period.  In the case of ineffective killing the method should be repeated or animals should be killed using a secondary killing method such as (*specify backup method*).  **Rationale:**  Additional information regarding animal welfare concerns when bleeding used as a primary method of humane killing  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method |

1. Animal-based and other measures

Animal-based and other measures that indicate loss of consciousness include all the following: absence of muscle tone; absence of corneal or palpebral reflex; absence of rhythmic breathing. Unconsciousness should be reassessed until death is confirmed. In addition, cessation of bleeding after a continuous and rapid blood flow can be used as an indicator of death.

1. Recommendations

Bleeding should only be used as a last resort in animals that are not already unconscious or can be rendered unconscious prior to severance of the blood vessels.

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| Australia | **Category**: Change  **Proposed amended text**:  Bleeding ~~should only be~~ ~~used as a last resort in animals that are not already unconscious or can be~~ is not recommended except where animals are rendered unconscious prior to severance of the blood vessels. Bleeding should not be used as a primary kill method, or on an animal that has not been successfully rendered unconscious.  Care must be taken to ensure that significant blood vessels in the neck or chest are cut cleanly and lead to rapid blood loss, as slow blood loss may lead to a slow loss of consciousness and prolonged suffering.  For ‘neck cuts’, both the jugular veins and carotid arteries should be cut.  For a ‘thoracic stick’, the vessels at the top of the heart should be severed.  Bleeding should be avoided when leakage of body fluids may present a biosecurity risk.  **Rationale:**  Bleeding a conscious animal would not be considered a method that prioritises animal welfare, and an alternative killing method used to render the animal unconscious before using bleeding as a secondary method.  Scientific evidence shows that exsanguination causes significant pain to animals if they are conscious (Gibson et al, 2009a, 2009b; EFSA, 2004; Gregory et al 2006, 2008, 2009, 2020, Johnson et al 2015).  Further guidance should also be provided on appropriate cutting techniques to ensure rapid bleeding and loss of consciousness.  **Supporting evidence, if relevant:**  Australian Veterinary Association (AVA) 2024, *Humane slaughter of animals*. Available at: <https://www.ava.com.au/policy-advocacy/policies/euthanasia/humane-slaughter-of-animals>.  Food and Agriculture Organisation of the United Nations (FAO, 2001). Guidelines for humane handling, transport and slaughter of livestock: <https://www.fao.org/3/x6909e/x6909e.pdf>.  Gibson T, Johnson C, Murrell J, Chambers J, Stafford J, Mellor D (2009a). Components of electroencephalographic responses to slaughter in halothane-anaesthetised calves: Effects of cutting neck tissues compared with major blood vessels. New Zealand Veterinary Journal. 57:2: p. 84-89.  Gibson T, Johnson C, Murrell J, Hulls C, Mitchinson S, Stafford K, et al (2009b) Electroencephalographic responses of halothane-anaesthetised calves to slaughter by ventral-neck incision without prior stunning. New Zealand Veterinary Journal. (57:2): p. 77-83.  Gregory N, Fielding H, von Wenzlawowicz M, von Holleben K (2020). Time to collapse following slaughter without stunning in cattle. Meat Sci. 85(1): p. 66-69  Gregory N, Shaw F, Whitford J, Patterson-Kane J (2006). Prevalence of ballooning of the severed carotid arteries at slaughter in cattle, calves and sheep. Meat Sci. 74(4): p. 655-657  Gregory N, von Wenzlawowicz M, Alam R, Anil H, Yeşildere T, Silva-Fletcher A (2008). False aneurysms in carotid arteries of cattle and water buffalo during shechita and halal slaughter. Meat Science. 79(2): p. 285-288  Gregory N, von Wenzlawowicz M, von Holleben K (2009). Blood in the respiratory tract during slaughter with and without stunning in cattle. Meat Science. 82(1): p. 13-16.  AVMA Guidelines for the Humane Slaughter of Animals: 2024 Edition  Gregory NG, Schuster P, Mirabito L, Kolesar R, McManus T. Arrested blood flow during false aneurysm formation in the carotid arteries of cattle slaughtered with and without stunning. Meat Sci. 2012;90(2):368–372. doi:10.1016/j. meatsci.2011.07.024  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_ |

1. Species-specific recommendations

None identified

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| Australia | **Category:** Addition  **Proposed amended text**:  Cattle may require a thoracic stick following a neck cut, as they may not effectively exsanguinate following only a neck cut (AVMA 2024, AUSVETPLAN 2015),  Pigs require a thoracic stick, severing the common brachiocephalic trunk, with a relatively long sticking wound recommended to maximise welfare.  ~~None identified~~  **Rationale:**  Changes to provide additional technical guidance for cattle and pigs.  We recommend further guidance is included in addition to the amendments already suggested (e.g. on appropriate techniques for cutting for other species).  **Supporting evidence, if relevant**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_  AVMA Guidelines for the Humane Slaughter of Animals: 2024 Edition  Anil MH, Whittington PE, McKinstry JL. The effect of the sticking method on the welfare of slaughter pigs. Meat Sci. 2000 Jul;55(3):315-9. doi: 10.1016/s0309-1740(99)00159-x. PMID: 22061289.  EFSA Panel on Animal Health and Welfare (AHAW), 2013. Scientific Opinion on monitoring procedures at slaughterhouses for pigs. *EFSA Journal*, *11*(12), p.3523.  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S.S., Alvarez, J., Bicout, D.J., Calistri, P., Depner, K., Drewe, J.A., Garin‐Bastuji, B., Gonzales Rojas, J.L., Gortázar Schmidt, C. and Michel, V., 2020. Welfare of pigs at slaughter. *Efsa Journal*, *18*(6), p.e06148.  Gregory NG, von Wenzlawowicz M, Alam RM, Anil HM, Yeşildere T, Silva-Fletcher A. False aneurysms in carotid arteries of cattle and water buffalo during shechita and halal slaughter. Meat Sci. 2  Gregory NG, Schuster P, Mirabito L, Kolesar R, McManus T. Arrested blood flow during false aneurysm formation in the carotid arteries of cattle slaughtered with and without stunning. Meat Sci. 2012;90(2):368–372. doi:10.1016/j. meatsci.2011.07.024 |

Article 7.6.16.

**Lethal injection**

Lethal injection is a procedure that involves injecting one or more drugs into an animal to cause rapid death.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for all animals covered by this chapter. Lethal injection is a procedure that involves injecting one or more drugs into an animal to cause rapid death. When performed correctly this method causes rapid loss of consciousness and death.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article |

The animal is injected intravenously with a lethal dose of anaesthetic drugs and may also receive an initial injection of a sedative. In practice, barbiturates in combination with other drugs are commonly used. They induce a smooth transition from consciousness to unconsciousness and death by causing depression of the central nervous system and respiratory centres in the brain leading to cardiac arrest (Shearer, 2018).

The preferred route of administration is intravenous (HSA 18; AVMA, 2020), but in some cases it may be given intramuscularly, intracardially or intraperitoneally.

1. Animal welfare concerns

If routes of administration are inappropriate, consciousness may not be lost rapidly before death, causing pain and fear.

If doses of administration are not correct (sub-lethal), consciousness may not be lost rapidly before death, causing fear.

Some combinations of drug type and route of administration may be painful and should only be used in unconscious animals.

During rapid injection, some drugs may cause pain, irritation and paralysis, which can cause the suppression of respiration while the animal is still conscious [EFSA, 2004].

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| Australia | **Category:** Addition  **Proposed amended text**:  During rapid injection, some drugs may cause pain, irritation and paralysis, which can cause the suppression of respiration while the animal is still conscious ~~[~~(EFSA, 2004)~~]~~. Some drugs may cause a period of excitation before suppression of activity occurs (AVMA 2013). During this period of excitation animals may move or kick unexpectedly, and so with larger animals, care should be taken for both the safety of the animal and of other animals or people nearby.  In the case of Ineffective killing, the method should be repeated, or animals should be killed using a secondary killing method such as *(specify backup method).*  **Rationale:**  Animals undergoing a period of excitement may kick out, posing a risk to others (people and animals).  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method  **Supporting evidence, if relevant**  Underwood, W. and Anthony, R., 2020. AVMA guidelines for the euthanasia of animals: 2020 edition. *Retrieved on March*, *2013*(30), pp.2020-1 |

Intracardiac administration can be extremely painful if penetration of the heart is not successful on the ﬁrst attempt (EFSA, 2004).

Personnel lacking appropriate training and skills, or personnel suffering fatigue, or fractious animals unable to be properly restrained, may cause ineffective administration and be detrimental to animal welfare (Søren et al., 2020).

1. Animal-based and other measures

Each animal should be examined carefully to conﬁrm loss of consciousness and death:

Posture, breathing, heart auscultation, corneal or palpebral reﬂex, vocalization and eyes movements.

Absence of brain stem reflexes.

1. Recommendations

The animal should be sedated before the lethal injection to minimize stress, if required.

Lethal injection should only be performed by a qualified veterinarian or under their direct supervision.

Personnel performing this method should be trained and knowledgeable in anaesthetic techniques.

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| Australia | **Category:** Addition  **Proposed amended text**:  Personnel performing this method should be trained and knowledgeable in anaesthetic techniques  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.  Ensure sufficient quantities of the drug, including extra above the estimated requirement, are available before commencing the process. An additional killing method may be required if the volume administered is inadequate to induce death and additional supplies of the drug are not immediately available.  **Rationale:**  Consideration to personal safety should be clearer.  The required doses of barbiturates (or other drugs) to induce death may vary significantly from animal to animal. It is important to ensure adequate supplies beforehand, particularly for large animals which may require very large volumes.  **Supporting evidence, if relevant**  AVMA Guidelines on Euthanasia 2020 |

Personnel should be trained to use appropriate presentation of the animal and skilled intravenous administration to avoid extravasation of the drug and to use the correct dose according to the species and the animal live weight.

Personnel should be trained to use appropriate restraint in case it is necessary.

Intravenous administration is preferred, but intraperitoneal or intramuscular administration may be appropriate, especially if the agent is non-irritating.

The intracardiac route may be used in previously anesthetized or very small animals only.

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| Australia | **Category**: Deletion  **Proposed amended text**:  The intracardiac route may be used in previously anesthetized ~~or very small~~ animals only.  **Rationale:**  Intracardiac administration has a high risk of pain and distress if the injection is misplaced  **Supporting evidence, if relevant:**  American Veterinary Medical Association (AVMA), 2020. *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. [pdf] Schaumburg, IL: AVMA. Available at: <https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf> [Accessed 20 May 2025].  Close, B., Banister, K., Baumans, V., Bernoth, E.M., Bromage, N., Bunyan, J., Erhardt, W., Flecknell, P., Gregory, N., Hackbarth, H. and Morton, D., 1996. *Recommendations for euthanasia of experimental animals: Part 1*. Laboratory Animals, 30(4), pp.293–316. |

Examine individual animals for signs of consciousness or life and apply a secondary killing method as a corrective measure, by giving a lethal injection of an anaesthetic drug if they are conscious or a lethal substance to kill them in case they are still alive but unconscious [AVMA, 2020].

The carcass of an animal that has been killed by lethal injection has to be disposed of properly and cannot be used for or where there may be a risk of human or animal consumption because of harmfulness of the used drugs.

This method is suitable for killing small numbers of dogs, cats, cattle, sheep, goats, pigs, equids, poultry, captive wildlife, but it can be used in all species.

1. Species-specific recommendations

The method is suitable for killing individual or small numbers of dogs, cats, cattle, sheep, goats, pigs, equids and poultry, but it can be used in all species.

In some species like cattle, restraint may be necessary prior to injection, if possible, to allow effective administration.

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| Australia | **Category:** Change  **Proposed amended text**:  The method is suitable for killing individual or small numbers of dogs, cats, cattle, sheep, goats, pigs, equids and poultry, but it can be used in all species.  In ~~some~~ most species ~~like cattle~~, restraint ~~may~~ will be necessary prior to injection, if possible, to allow effective administration.  **Rationale:**  It is unlikely that lethal injection (particularly intravenous and intracardiac, but also intraperitoneal and intramuscular) would be feasible without some degree of physical or chemical restraint being applied beforehand |

Venous access can be difficult in very small or young animals or animals with low blood pressure taking considerable veterinary skill and experience.

Article 7.6.17.

**Cervical dislocation**

Manual or mechanical cervical dislocation comprises stretching and twisting the neck, resulting in the separation of spinal cord from the brain and *death* from cerebral anoxia due to cessation of breathing or blood supply to the brain [AVMA, 2020].

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for small birds, poultry, mice, rats, and rabbits as a secondary killing method and subject to the limitations outlined in the species specific recommendations. Manual or mechanical cervical dislocation comprises stretching and twisting the neck, resulting in the separation of spinal cord from the brain and death from cerebral anoxia due to cessation of breathing or blood supply to the brain [AVMA, 2020].  This method is only recommended for killing following stunning because animals may not immediately lose consciousness and therefore may experience considerable distress and pain.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. Guidance on use of this method made in view of its limitations. |

1. Animal welfare concerns

Cervical dislocation even with separation of the spinal cord fails to produce immediate loss of consciousness and in this case animals may die due to asphyxiation [Gregory and Wotton, 1990].

For heavy rats and rabbits, the large muscle mass in the cervical region makes manual cervical dislocation physically more difficult

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| Australia | **Category:** Addition  **Proposed amended text**:  For heavy rats and rabbits, the large muscle mass in the cervical region makes manual cervical dislocation physically more difficult.  Manual restraint and inversion is often required, which may cause stress in conscious animals.  In the case of ineffective killing, animals should be killed using a backup system such as *(insert backup method).*  **Rationale:**  The manual handling required for this method may cause stress, which supports that animals should be unconscious prior to this method being used.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method. |

1. Animal-based and other measures

Animal-based measures of an effective application of cervical dislocation are signs of death.

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| Australia | **Category:** Addition  **Proposed amended text**:  Animal-based measures of an effective application of cervical dislocation are signs of death, including immediate collapse and loss of muscle tone, apnoea, absence of eye movement, absence of corneal reflex, absence of palpebral reflex, lack of heartbeat and breathing.  **Rationale:**  Suggest additional information is provided about relevant signs of deaths |

1. Recommendations

Only to be used in unconscious animals.

Consistent results when performing manual cervical dislocation requires strength and skill so team members should be rested regularly to avoid fatigue and ensure consistently reliable results.

Mechanical cervical dislocation is preferred to manual as is more reliable and less prone to failure.

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| Australia | **Category:** Addition  **Proposed amended text**:  Mechanical cervical dislocation ~~is~~ may be preferred to manual ~~as~~ in situations where it is more reliable and less prone to failure, however some mechanical aids may cause inadvertent crushing. Only devices shown to repeatedly and reliably cause dislocation and severing of the spinal cord, rather than crushing, should be used.  **Rationale:**  Some mechanical aids have a higher risk of crushing rather than dislocating, and these should not be used.  **Supporting evidence, if relevant**  Jacobs, L., Bourassa, D.V., Harris, C.E. and Buhr, R.J., 2019. Euthanasia: manual versus mechanical cervical dislocation for broilers. Animals, 9(2), p.47.  Jacobs, L., Bourassa, D.V., Boyal, R.S., Harris, C.E., Josselson, L.N.B., Campbell, A., Anderson, G. and Buhr, R.J., 2021. Animal welfare assessment of on-farm euthanasia methods for individual, heavy turkeys. Poultry Science, 100(3), p.100812.  Woolcott CR, Torrey S, Turner PV, Chalmers H, Levison LJ, Schwean-Lardner K & Widowski TM (2018). Assessing a Method of Mechanical Cervical Dislocation as a Humane Option for On-Farm Killing Using Anesthetized Poults and Young Turkeys. Front. Vet. Sci. 5:275. |

Cervical dislocation by crushing of vertebrae and spinal cord should not be used.

Animals should be monitored continuously until death to ensure the absence of brain stem reflexes.

The method is suitable for small birds, poultry, mice, rats and rabbits.

1. Species-specific recommendations

Manual cervical dislocation is applicable in birds weighing up to 3 kg. and in rats up to 200 g

Mechanical cervical dislocation is applicable in birds weighing up to 5 kg.

None identified

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| Australia | **Category**: Addition  **Proposed amended text**:  Manual cervical dislocation is applicable in birds weighing up to 3 kg~~.~~ and in rats up to 200 g  Mechanical cervical dislocation is applicable in birds weighing up to 5 kg.  ~~None identified~~ Cervical dislocation is applicable in immature rabbits weighing up to 1 kg.  **Rationale:**  The application specifics of cervical dislocation in rabbits should be provided as for the other species listed to ensure appropriate use of the method. “None identified” appears to have been accidentally included and requires deletion, as there are species-specific recommendations listed.  **Supporting evidence, if relevant:**  Campagnol, M. 2022, *Anaesthesia, analgesia, and killing*, in Dal Negro, G. & Sabbioni, S. (eds.), *Practical Handbook on the 3Rs in the Context of the Directive 2010/63/EU*, Academic Press, pp. 241–258. DOI: <https://doi.org/10.1016/B978-0-12-821180-9.00011-8>. |

Article 7.6.18.

**Decapitation**

Decapitation using a guillotine or knife results in death by cerebral ischaemia.

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| Australia | **Category:** Addition  **Proposed amended text:**  This method is suitable as a secondary killing method for all animals covered by this chapter. Decapitation using a guillotine or knife results in death by cerebral ischemia.  This method is only recommended for killing following stunning because animals may not immediately lose consciousness, and it may be painful in conscious animals.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. Guidance on the use of this method is suggested in view of its limitations. |

1. Animal welfare concerns

The process of decapitation requires significant tissue trauma and this may be painful if the animal has not been rendered unconscious prior to the procedure [Kongara et al. 2014]. There is evidence that decapitation may not itself cause immediate loss of consciousness, which [Bates 2010] may persist in decapitated animals for as long as 30 seconds [Mikeska and Klemm 1975].

1. Animal-based and other measures

Successful decapitation completely separates the head from the rest of the body and can be confirmed by visual inspection.

1. Recommendations

Decapitation should only be used as a last resort in animals that are not already unconscious or can be rendered unconscious prior to decapitation.

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| Australia | **Category**: Change  **Proposed amended text**:  Decapitation should only be used ~~as a last resort~~ in animals ~~that are not already unconscious or can be~~ rendered unconscious prior to decapitation. Decapitation should not be used as a primary kill method, or on an animal that has not been successfully rendered unconscious.Decapitation should not be used when leakage of body fluids may present a biosecurity risk.  In the case of ineffective killing, animals should be killed using a secondary killing method such as *(insert backup method).*  **Rationale:**  Decapitation of a conscious animal would not be considered a method that prioritises animal welfare for all species due to factors such as consciousness after decapitation and difficulty in achieving severance of the head from the neck in one cut (e.g. large animals with thick necks such as cattle, pigs, sheep, etc). An alternative killing method should be sought if the animal cannot be rendered unconscious prior to decapitation.  The AVMA only refers to decapitation as a killing method for rodents and rabbits in research setting where preservation of body tissue is required.  In Australia, decapitation is currently not permitted as primary killing method without stunning. It is only permitted as terminal procedure in unconscious animals.  Neurophysiological studies have shown that post-decapitation brain activity is not indicative of immediate unconsciousness and varies greatly between species.  Decapitation can result in contamination of the surrounding area and should be avoided if these fluids pose a biosecurity risk.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method  **Supporting evidence, if relevant:**  American Veterinary Medical Association (AVMA) 2020, *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. Available at: <https://www.avma.org/sites/default/files/2020-01/AVMA-Euthanasia-Guidelines-2020.pdf>  Hewitt, L. 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, pp. 1–46 |

1. Species-specific recommendations

Equipment used for decapitation should be of sufficient construction and sharpness to complete the procedure quickly and without undue force.

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| Australia | **Category:** Change  **Proposed amended text**:  3. Recommendations  Equipment used for decapitation should be of sufficient construction and sharpness to complete the procedure quickly and without undue force.  4. Species-specific recommendations  ~~Equipment used for decapitation should be of sufficient construction and sharpness to complete the procedure quickly and without undue force.~~  None identified  **Rationale:**  This information appears to be better suited for inclusion in the section 3 above, as it is not species specific |

Article 7.6.19.

**Electrical — two-stage application**

A two-stage application of low frequency electric current (50 Hz) comprises firstly an application of current to the head by scissor-type tongs that spans the brain, immediately followed by an application of the tongs across the chest in a position that spans the heart.

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| Australia | **Category** Addition  **Proposed amended text**:  This method is suitable for calves, sheep and goats, and pigs. A two-stage application of low frequency electric current (50 Hz) comprises firstly an application of current to the head by scissor-type tongs that spans the brain, immediately followed by an application of the tongs across the chest in a position that spans the heart. When performed correctly this method causes immediate loss of consciousness and death.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

The application of sufficient electric current to the head will induce ‘tonic-clonic’ epilepsy and unconsciousness. Once the animal is unconscious, the second stage will induce ventricular fibrillation (cardiac arrest) resulting in death.

1. Animal welfare concerns

The main hazards preventing effective electrical stunning and killing are: incorrect electrode placement, poor contact, a dirty or corroded electrode, electrical arcing, high contact resistance caused by hair or dirt on the animal surface, too short exposure time and inappropriate electrical parameters (low voltage/current or high frequency).

The second stage should only be applied to unconscious animals to prevent unacceptable levels of pain.

1. Animal-based and other measures

Before the application of the second stage, unconsciousness should be assessed with the following animal-based measures: immediately collapse, tonic-clonic seizures; apnoea; absence of corneal or palpebral reflex.

Animal-based measures of ineffective stun or recovery of consciousness are: vocalisation; spontaneous blinking; righting reflex; presence of corneal or palpebral reflex; rhythmic breathing; spontaneous swallowing and head shaking.

After the application of the second stage, death should be assessed with the following animal-based measures: absence of muscle tone, apnoea, absence of corneal reflex, dilated pupils and absence of heartbeat.

1. Recommendations

Two team members are recommended, the first to apply the electrodes and the second to manipulate the position of the animal to allow the second application to be made.

Animals should be restrained, at a minimum free-standing in a pen.

The tongs should be of the correct design and size for the animal;

A stunning current should be applied in a position that spans the brain for a minimum of 3 seconds; immediately following the application to the head and after ensuring that the animal is unconscious, the electrodes should be transferred to a position that spans the heart and the electrodes applied for a minimum of 3 seconds.

Electrodes should be applied firmly for the intended duration of time with pressure not released until the stun is complete.

Animals should be monitored continuously after stunning until death to ensure the absence of brain stem reflexes.

Electrodes should be in good condition and cleaned regularly during and after use, to enable optimum electrical contact to be maintained.

The wool or hair should be entirely dry; if wet the electricity may flow (shunt) through the wet wool or hair rather than contacting the skin and passing through the brain or body.

Wetting the bare skin (not wool or hair) application area with water (especially salted water) can increase electrical contact.

Ineffective application of the first stage of the method should be followed by a backup method or the repetition of the first stage.

The method is suitable for calves, sheep and goats, and pigs.

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| Australia | **Category:** Addition  **Proposed amended text**:  Two team members are recommended, the first to apply the electrodes and the second to manipulate the position of the animal to allow the second application to be made.  Work health and safety considerations need to be addressed when working with electrical devices that are developed to kill animals.  Animals should be restrained, at a minimum free-standing in a pen.  The tongs should be of the correct design and size for the animal~~;~~.  A stunning current should be applied in a position that spans the brain for a minimum of 3 seconds or longer as recommended for the specific species; immediately following the application to the head and after ensuring that the animal is unconscious, and no more than 15 seconds later, the electrodes should be transferred to a position that spans the heart and the electrodes applied for a minimum of 3 seconds.  Electrodes should be applied firmly for the intended duration of time with pressure not released until the stun is complete.  Animals should be monitored continuously after stunning until death to ensure the absence of brain stem reflexes.  Equipment for stunning should be regularly maintained and calibrated. Electrodes should be in good condition and cleaned regularly during and after use, to enable optimum electrical contact to be maintained.  The wool or hair should be entirely dry; if wet the electricity may flow (shunt) through the wet wool or hair rather than contacting the skin and passing through the brain or body.  Wetting the bare skin (not wool or hair) application area with water (especially salted water) can increase electrical contact.  Ineffective application of the first stage of the method should be followed by ~~a backup method or~~ ~~the~~ repetition of the first stage or secondary killing method such as (*specify backup method*).  ~~The method is suitable for calves, sheep and goats, and pigs.~~  **Rationale:**  Short duration of stunning may not result in an effective stun and longer periods may be required. In addition, consciousness may return in as little as 15-20 seconds, therefore the second application should occur before that time, allowing enough time for the second application to occur and for unconsciousness onset from that secondary procedure, before return to consciousness associated with the first stun. Head-only electrocution should not be used if a secondary method cannot be applied within 15 seconds of initial stunning of the pig. All equipment involved should be subject to regular maintenance and calibration, to ensure effective stunning.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method.  Deletion of listed species suitable for as previously recommended to move to the front of the chapter.  **Supporting evidence, if relevant –**  AVMA Humane slaughter guidelines 2024, [avma.org/sites/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf](https://www.avma.org/sites/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf).  AVMA Guidelines for the Depopulation of Animals: 2019 Edition - <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf>.  Berg, C., Nordensten, C., Hultgren, J. and Algers, B., 2012. The effect of stun duration and level of applied current on stun and meat quality of electrically stunned lambs under commercial conditions. *Animal Welfare*, *21*(S2), pp.131-138.  Blackmore, D.K. and Newhook, J.C., 1982. Electroencephalographic studies of stunning and slaughter of sheep and calves—Part 3: The duration of insensibility induced by electrical stunning in sheep and calves. *Meat Science*, *7*(1), pp.19-28.  doi:10.1016/0309-1740(82)90094-8.  Hewitt, L. and Small, A., An independent scientific review of processing establishment practices for livestock welfare - [An Independent Scientific Review of Processing Establishment Practices for Livestock Welfare.](https://www.agriculture.gov.au/sites/default/files/documents/independent-scientific-literature-review-livestock-welfare-processing-establishments.pdf)  Lambooy, E.J.M.S., 1982. Electrical stunning of sheep. *Meat Science*, *6*(2), pp.123-135. doi:10.1016/0309-1740(82)90022-5 |

1. Species-specific recommendations

Effective electrical parameters should be determined based on scientific evidence for different types of animals.

For electrical stunning of the head, minimum parameters are recommended for the following species:

* 1.5 A for bovines,
* 1.3 A for pigs,
* 1.8 A for sows and boars,
* 1.0 A for small ruminants.

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| Australia | **Category:** Change  **Proposed amended text**:  For electrical stunning of the head, minimum parameters are recommended for the following species:   * 1.5 A for ~~bovines~~ calves, * 1.3 A for pigs, * 1.8 A for sows and boars, * 1.25~~1.0~~ A for ~~small ruminants~~ sheep and goats.   **Rationale:**  Higher stunning parameters may be recommended. Keep terminology consistent.  **Supporting evidence, if relevant –**  Berg, C., Nordensten, C., Hultgren, J. and Algers, B., 2012. The effect of stun duration and level of applied current on stun and meat quality of electrically stunned lambs under commercial conditions. *Animal Welfare*, *21*(S2), pp.131-138.  AVMA Humane slaughter guidelines 2024, [avma.org/sites/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf](https://www.avma.org/sites/default/files/2024-09/Humane-Slaughter-Guidelines-2024.pdf).  AVMA Guidelines for the Depopulation of Animals: 2019 Edition - <https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf>. |

Good placement of the tongs can be difficult on animals with horns and on sheep with woolly heads. Using electrodes with pins or with wet pins for woolly animals would help to overcome the problem. Alternatively, the wool should be removed from the area where the electrodes will be positioned on the animal.

Article 7.6.20.

**Head to body electrical killing**

Head-to-body electrical killing (electrocution) comprises the single application of sufficient electrical current to the head and back, to simultaneously stun the animal and fibrillate the heart. Provided sufficient current is applied in a position that spans both the brain and heart at the same time, the animal will not recover consciousness.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for sheep and goats, and pigs. Head-to-body electrical killing (electrocution) comprises the single application of sufficient electrical current to the head and back, to simultaneously stun the animal and fibrillate the heart, resulting in cardiac arrest and death.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Other edits for clarity  **Supporting evidence, if relevant:**  AUSVETPLAN – Operational Manual - Destruction of animals v3.2 2015, available at https://animalhealthaustralia.com.au/ausvetplan/\_  AVMA Guidelines for the Humane Slaughter of Animals: 2024 Edition |
| Australia | **Category:** Addition  **Proposed amended text:**  Provided sufficient current is applied in a position that spans both the brain and heart at the same time, the animal will not recover consciousness.The approach must be used with amperage settings that have been scientifi­cally verified to induce a seizure.  **Rationale**:  Addition to ensure correct settings used for this method.  **Reference:**  AVMA (American Veterinary Medical Association) (2020). AVMA guidelines for the euthanasia of animals, 2020 edition. AMVA, Schaumburg, Illinois. Available [online: ht](https://animalhealthaust.sharepoint.com/sites/AUSVETPLANManualReviews-DestructionofAnimals/Shared%20Documents/Destruction%20of%20Animals/Manual/%20online:%20ht)tps://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf |

1. Animal welfare concerns

The main hazards preventing effective electrical killing are: incorrect electrode placement, poor contact, dirty or corroded electrode, electrical arcing, high contact resistance caused by hair or dirt on the animal surface, too short exposure time and inappropriate electrical parameters (low voltage/current or high frequency).

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| Australia | **Category:** Addition  **Proposed amended text**:  The main hazards preventing effective electrical killing are: incorrect electrode placement, poor contact, dirty or corroded electrode, electrical arcing, high contact resistance caused by hair or dirt on the animal surface, too short exposure time and inappropriate electrical parameters (low voltage/current or high frequency).  Dehydrated animals that have been off water for are poor conductors of electricity and electrical stunning failures are a significant risk.  When performed correctly this method is a one-stage procedure causing immediate loss of consciousness and death. A one-stage killing procedure risks distress, fear, and pain if the animal has not been immediately or rapidly rendered unconscious in the procedure. Ineffective application of the method should be followed by repetition of the method or (specify backup method).  **Rationale:**  Addition to include further appropriate animal welfare risks of this method.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method.  **Supporting evidence, if relevant**  AVMA (American Veterinary Medical Association) (2020). AVMA guidelines for the euthanasia of animals, 2020 edition. AMVA, Schaumburg, Illinois. Available [online: ht](https://animalhealthaust.sharepoint.com/sites/AUSVETPLANManualReviews-DestructionofAnimals/Shared%20Documents/Destruction%20of%20Animals/Manual/%20online:%20ht)tps://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf |

Article 7.6.21.

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| Australia | **Category:** General  **Comment:**  We recommend that additional information be included in this article and other similar articles, regarding correct restraint, positioning of animals and stunner contacts, and handling of animals for electrical stunning. |

**Head only electrical stunning followed by a secondary killing method**

Comprises the single application of sufficient electrical current to the head of the animal in a position that spans the brain, causing unconsciousness; this needs to be followed by a killing method such as cervical dislocation or bleeding.

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| Australia | **Category:** Addition  **Proposed amended text**:  **Head only electrical stunning ~~followed by a secondary killing method~~**  This method is suitable for chickens, turkeys, ducks, geese, and rabbits.  Comprises the single application of sufficient electrical current to the head of the animal in a position that spans the brain, causing temporary unconsciousness; this needs to be followed by a killing method such as cervical dislocation or bleeding. Electrical stunning is reversible and must be followed by a killing method without delay.  **Rationale:**  Deletion in heading for consistency with other articles on stunning methods.  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Animals can recover after electrical stunning and therefore a secondary killing method is required before the animals regain consciousness. References indicate that the secondary killing method needs to occur within 10-15 seconds following the end of the electrical stun to prevent return to consciousness.  **Supporting evidence, if relevant**  Hewitt, L. and Small, A., 2021. An independent animal welfare assessment of mass destruction methods for poultry on-farm. [An independent animal welfare assessment of mass destruction methods for poultry on-farm](https://www.agriculture.gov.au/sites/default/files/documents/independent-animal-welfare-assessment-mass-destruction-methods-poultry-on-farm.pdf). Accessed 16 May 2025.  Countreras-Jodar, A., Michel, V., Vinco, L.J., Varvaro-Porter, A. and Velarde, A., 2025. Relevant Indicators of Consciousness After Head-Only Electrical Stunning in Rabbits, Stunning Efficiency, and Risk Factors in Commercial Conditions. *Animals,* 15(4), pp. 1-28.  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of cattle during killing for purposes other than slaughter. [EFSA Journal - 2020 - -Welfare of cattle during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202020%20-%20%20-%20Welfare%20of%20cattle%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 16 May 2025.  EFSA Panel on Animal Health and Welfare (AHAW), 2020. Welfare of sheep and goats during killing for purposes other than slaughter. [EFSA Journal - 2024 - - Welfare of sheep and goats during killing for purposes other than slaughter.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202024%20-%20%20-%20Welfare%20of%20sheep%20and%20goats%20during%20killing%20for%20purposes%20other%20than%20slaughter.pdf). Accessed 12 May 2025.  Humane Slaughter Association (HSA) 2021, Practical slaughter of poultry, Wheathampstead, Herts, UK. Available at: <https://www.hsa.org.uk/downloads/publications/practicalslaughterofpoultrydownload-cm-updated.pdf>  Hewitt, L 2023, An independent animal welfare assessment of mass destruction methods for poultry on-farm, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0. Available at <https://www.agriculture.gov.au/biosecurity-trade/policy/emergency/maintaining-good-animal-welfare-outcomes> |

1. Animal welfare concerns

The main hazards preventing effective electrical stunning are: inappropriate handling, inversion when applicable, incorrect electrode placement, poor contact, dirty or corroded electrode, electrical arcing, high contact resistance caused by hair or feathers or dirt on the animal surface and inappropriate electrical parameters (low voltage/current or high frequency).

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| Australia | **Category:** Addition  **Proposed amended text**:  The main hazards preventing effective electrical stunning are: inappropriate handling, inversion when applicable, incorrect electrode placement, poor contact, dirty or corroded electrode, electrical arcing, high contact resistance caused by hair or feathers or dirt on the animal surface and inappropriate electrical parameters (low voltage/current or high frequency).  In the case of ineffective stunning or recovery, animals should be re-stunned using a backup system or be killed immediately by *(specify backup method).*  **Rationale:**  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method |

An additional hazard could occur when second intervention doesn’t kill the animal.

1. Animal-based and other measures

Multiple indicators should be used to determine whether a stun is effective and the animal is unconscious.

Animal-based measures of an effective stun are: tonic-clonic seizures; apnoea; absence of corneal or palpebral reflex.

Animal-based measures of an ineffective stun or recovery of consciousness or for ineffective killing are: vocalisation; spontaneous blinking; righting reflex; presence of corneal or palpebral reflex; rhythmic breathing.

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| Australia | **Category:** Addition  **Proposed amended text**:  Animal-based measures of an ineffective stun or recovery of consciousness or for ineffective killing are: vocalisation; spontaneous blinking; righting reflex; presence of corneal or palpebral reflex; rhythmic breathing and head shaking or wing flapping in poultry.  **Rationale:**  Poultry-based animal welfare measures are required for Head only electrical stunning followed by a secondary killing method  **Supporting evidence, if relevant**  Hewitt, L. and Small, A., 2021. *An independent animal welfare assessment of mass destruction methods for poultry on-farm*. Accessed 16 May 2025. |

1. Recommendations

Animals should be stunned as soon as they are restrained.

In the case of ineffective stunning or recovery, animals should be re-stunned using a backup system or be killed immediately. Ineffective stunning or return to consciousness should be systematically recorded and the cause of the failure identified and rectified.

Stunning equipment should be used, cleaned, maintained and stored following the manufacturer's recommendations.

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| Australia | **Category:** Addition  **Proposed amended text**:  Stunning equipment should be used, cleaned, maintained and stored following the manufacturer's recommendations.  The equipment should be of the correct design and size for the animal.  **Rationale:**  Stunning equipment that is not appropriate for the species, class and / or size of the animal may contribute to the animal regaining consciousness before killing. For example, Counteraras-Jodar et al (2025) noted that electrical tongs which were designed for heavier rabbits (with larger heads) did not sufficiently press on the heads of smaller rabbits leading to impaired electrical contact  **Supporting evidence, if relevant**  Contreras-Jodar, A., Michel, V., Vinco, L.J., Varvaró-Porter, A. and Velarde, A., 2025. Relevant Indicators of Consciousness After Head-Only Electrical Stunning in Rabbits, Stunning Efficiency, and Risk Factors in Commercial Conditions. *Animals*, *15*(4), p.587. |

Constant current stunners ensure that the minimum current is provided to the animal independently from individual impedance and should always be preferred to constant voltage stunners.

Regular calibration of the equipment according to the manufacturer's procedure is recommended.

For the killing methods to be use after stun refer to Articles 7.6.X and 7.6.X.

This method is suitable for chickens, turkeys, ducks, geese and rabbits.

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~This method is suitable for chickens, turkeys, ducks, geese, and rabbits.~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

For head-only stunning, minimum parameters are recommended for the following species:

* 240 mA for hens and broiler chicken,
* 400 mA for turkeys,
* 600 mA for geese and ducks,
* 400 mA for rabbits.

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| Australia | **Category:** Addition  **Proposed amended text**:  For head-only stunning, minimum parameters are recommended for the following species:   * 240 mA for hens and broiler chicken, * 400 mA for turkeys, * 600 mA for geese and ducks, * 400 mA for rabbits.   For poultry, the secondary method should be applied within 10 seconds of head-only stunning  **Rationale:**  Electrical stunning results in reversible loss of consciousness only**.**  **Supporting evidence, if relevant**  EFSA Panel on Animal Health and Welfare (AHAW), 2019. Killing for purposes other than slaughter: poultry. [EFSA Journal - 2019 - - Killing for purposes other than slaughter poultry.pdf](file:///C:\Users\AK0090\OneDrive%20-%20Agriculture\Desktop\A2.%20May%202025\Pithing\EFSA%20Journal%20-%202019%20-%20%20-%20Killing%20for%20purposes%20other%20than%20slaughter%20%20poultry.pdf). Accessed 16 May 2025.  Hewitt, L. and Small, A., 2021. An independent animal welfare assessment of mass destruction methods for poultry on-farm. [An independent animal welfare assessment of mass destruction methods for poultry on-farm](https://www.agriculture.gov.au/sites/default/files/documents/independent-animal-welfare-assessment-mass-destruction-methods-poultry-on-farm.pdf). Accessed 16 May 2025. |

Article 7.6.22.

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| Australia | **Category**: General  **Comment:** No species specific recommendations are yet provided and the current suggested in the recommendations also does not provide any species-specific guidance. However, Humane Slaughter Association provides detailed advice on this topic including specific recommendations, which are likely to be relevant here.  **Supporting evidence, if relevant :**  <https://www.hsa.org.uk/downloads/hsagn7waterbathpoultryapril2016pdfoptimiser.pdf> |

**Water bath killing**

Electrocution leading to death can be achieved by drawing inverted and shackled poultry through an electrified water bath. Electrical contact is made between the water and earthed shackle and, when sufficient current (50 Hz AC) is applied, poultry will be simultaneously stunned and killed.

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| Australia | **Category:** Change  **Proposed amended text**:  This method is suitable for poultry. Electrocution leading to death can be achieved by drawing inverted and shackled poultry through an electrified water bath. Electrical contact is made between the water and earthed shackle and, when sufficient current ~~(50 Hz AC)~~ is applied, poultry will be simultaneously stunned and killed.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  This appears to confuse current and frequency. Also, the required frequency is mentioned later in this article, so is not needed here. |

1. Animal welfare concerns

In electrical water-bath killing, inverting and shackling conscious poultry by the legs can cause pain and fear.

Hazards that increase the likelihood of animals experiencing pre-stun shocks are: poor handling at shackling, inappropriate line speed, physical contact between birds, incorrect angle of entry ramp, entry ramp wetted by charged water, incorrect water-bath height, and shallow immersion.

Hazards that may prevent effective electrical killing are: lack of contact between head and water, differences in individual bird resistance, improper system grounding, pre-stun shocks due to wings contacting water before the head, and the use of inappropriate electrical parameters (low voltage/current or high frequency) or too short exposure time.

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| Australia | **Category:** Addition  **Proposed amended text**:  Hazards that may prevent effective electrical killing are: lack of contact between head and water, differences in individual bird resistance, improper system grounding, pre-stun shocks due to wings contacting water before the head, and the use of inappropriate electrical parameters (low voltage/current or high frequency) or too short exposure time.  When performed correctly this method is a one-stage procedure causing immediate loss of consciousness and death. A one-stage killing procedure risks distress, fear, and pain if the animal has not been immediately or rapidly rendered unconscious in the procedure. Ineffective application of the method (ineffective stunning or killing) should be followed by *(specify backup method).*  **Rationale:**.  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method. |

Factors affecting individual bird resistance include the resistance between the shackle and the leg (leg/shackle interface), shackling on top of a severed foot, shackling by one leg, poor shackle position, incorrect shackle size, dry shackles, scale on the shackle surface, and keratinised skin on the legs (e.g. older birds).

Where insufficient electrical killing parameters are used, conscious animals are at risk of being electro-immobilised or paralysed causing pain and suffering.

1. Animal-based and other measures

Multiple indicators should be used to determine whether killing is effective.

Animal-based measures of an effective electrocution are: absence of muscle tone; apnoea; and absence of corneal or palpebral reflex; absence of vocalisation and absence of righting reflex.

1. Recommendations

Poultry should be shackled by both legs. Shackles should match the species and size of the birds to guarantee a good contact.

Pre-stun shocks should be prevented and can be reduced by having a smooth shackle line and entry to the water-bath and by adjusting the water level of the bath to minimise overflow. Proper waterbath design, including a non-conductive entrance, will also help eliminate pre-stun shocks. Measures to calm the birds or to reduce the frequency of wing flapping can be put in place such as: breast rubs, low lighting, smooth transition into the waterbath and gentle shackling such that this does not trigger wing flapping.

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| Australia | **Category:** Addition  **Proposed amended text**:  Pre-stun shocks should be prevented and can be reduced by having a smooth shackle line and entry to the water-bath and by adjusting the water level of the bath to minimise overflow. Proper waterbath design, including a non-conductive entrance, will also help eliminate pre-stun shocks. Measures to calm the birds or to reduce the frequency of wing flapping can be put in place such as: breast rubs, low lighting, smooth transition into the waterbath and gentle shackling such that this does not trigger wing flapping.  Birds that are visibly injured including with leg abnormalities, or runts that may miss the waterbath, should not be shackled and instead should be killed by an alternative appropriate method.  **Rationale:**  Birds that have injuries may experience more pain from shackling, and birds with injuries or small birds (runts) may not properly reach the waterbath or receive sufficient electrical current, and should be killed using a different method.  **Supporting evidence, if relevant**  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S.S., Alvarez, J., Bicout, D.J., Calistri, P., Depner, K., Drewe, J.A., Garin‐Bastuji, B., Gonzales Rojas, J.L., Gortázar Schmidt, C. and Miranda Chueca, M.Á., 2019. Killing for purposes other than slaughter: poultry. *EFSA Journal*, *17*(11), p.e05850. |

Poultry should be submerged into the water up to the base of the wings.

A low frequency (50 Hz) current with a minimum of 400 mA per bird should be applied for a minimum of 3 seconds [EFSA, 2019].

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| Australia | **Category**: Addition  **Proposed amended text**:  A low frequency (50 Hz) sine wave AC current with a minimum of 400 mA per bird should be applied for a minimum of ~~3~~4 seconds [EFSA, 2019]. Line speeds should not be so fast as to cause animals to struggle. The total current should be calculated taking into account the number of birds that will be in the waterbath at any one time.  **Rationale**:  Both EFSA 2019 document on poultry slaughter and killing for non slaughter purposes, recommend at least 4 seconds duration of exposure, and use of a sine wave AC current.  Fast line speeds may cause animals to swing around, increasing wing flapping.  Additional clarity is recommended about the total current that will be required.  **Supporting evidence, if relevant**  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S.S., Alvarez, J., Bicout, D.J., Calistri, P., Depner, K., Drewe, J.A., Garin‐Bastuji, B., Gonzales Rojas, J.L., Gortázar Schmidt, C. and Miranda Chueca, M.Á., 2019. Slaughter of animals: poultry. *EFSA Journal*, *17*(11), p.e05849.  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S.S., Alvarez, J., Bicout, D.J., Calistri, P., Depner, K., Drewe, J.A., Garin‐Bastuji, B., Gonzales Rojas, J.L., Gortázar Schmidt, C. and Miranda Chueca, M.Á., 2019. Killing for purposes other than slaughter: poultry. *EFSA Journal*, *17*(11), p.e05850. |

Death should be confirmed before disposal.

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| Australia | **Category:** Addition  **Proposed amended text**:  Death should be confirmed before disposal. The effectiveness of stunning and killing should be monitored and equipment checked and adjusted as needed.  **Rationale:**  A number of factors may impact the effectiveness of this method of killing, and close monitoring is recommended to ensure adjustments can be made. |

In the case of ineffective killing, animals should be killed without delay using a backup system.

1. Species-specific recommendations

None identified

Article 7.6.23.

**Maceration**

Maceration, utilising a mechanical apparatus with rotating blades or projections, causes immediate fragmentation and death in day-old birds and for embryonated eggs.

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| Australia | **Category:** Change  **Proposed amended text**:  This method is suitable for day-old birds and for embryonated eggs. Maceration, utilising a mechanical apparatus with rotating blades or projections, causes immediate fragmentation and death ~~in day-old birds and for embryonated eggs~~.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

Article 7.6.24.

**Addition of anaesthetics to feed or water**

An anaesthetic agent which can be mixed with *poultry* feed or water may be used to kill *poultry* in houses. Commonly used general anaesthetic agents are not intended or approved for oral use. *Poultry* which are only anaesthetised need to be killed by another method such as cervical dislocation.

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| Australia | **Category:** Change  **Proposed amended text**:  An anaesthetic agent which can be mixed with poultry feed or water may be used to kill poultry in houses. When performed correctly this method causes rapid loss of consciousness. Anaesthesia needs to be followed by immediate killing using another method such as cervical dislocation. Commonly used general anaesthetic agents are not intended or approved for oral use. ~~Poultry which are only anaesthetised need to be killed by another method such as cervical dislocation.~~  **Rationale:**  As noted in general comments, we recommend inclusion of advice regarding an appropriate secondary killing method. |

1. Animal welfare concerns

Ingestion of an insufficient quantity of the drug or inappropriate drug not leading to unconsciousness.. Failing to implement a secondary killing method before consciousness regained. Exposure of non-targeted animal or birds is a risk[https://www.hsa.org.uk]

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| Australia | **Category:** Addition  **Proposed amended text**:  Ingestion of an insufficient quantity of the drug or inappropriate drug not leading to unconsciousness.~~.~~ Failing to implement a secondary killing method before consciousness regained. Exposure of non-targeted animal or birds is a risk[https://www.hsa.org.uk]  Risks to other animals which may scavenge carcasses and experience secondary intoxication.  **Rationale:**  Secondary intoxication is a risk to scavenging animals that may ingest the carcasses |

1. Animal-based and other measures

Absence of signs of life including breathing, body movement, righting reflex.

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| Australia | **Category:** Addition  **Proposed amended text**:  2. Animal-based and other measures  Multiple indicators should be used to confirm unconsciousness and death:  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex.  Additional signs that indicate the a~~A~~bsence of ~~signs o~~f life~~,~~ include~~ing~~ lack of breathing, heartbeat, or brain stem reflexes ~~body movement, righting reflex.~~  **Rationale:**  Anaesthetics may cause only unconsciousness without death, therefore it is important to differentiate the two to ensure a secondary killing process can be applied if necessary. |

1. Recommendations

To ensure that these anaesthetics have been effectively removed from the feeding or drinking water system and that no residue is left behind that could harm the next flock, a very careful cleaning procedure is necessary. Sufficient quantities of anaesthetic need to be ingested rapidly for effective response. Intake of sufficient quantities is facilitated if the birds are fasted or water is withheld. Should be followed by immediate killing if birds are anaesthetised only.

This method is suitable for confined poultry.

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| Australia | **Category:** Change  **Proposed amended text**:  To ensure that these anaesthetics have been effectively removed from the feeding or drinking water system and that no residue is left behind that could harm the next flock, a very careful cleaning procedure is necessary. Sufficient quantities of anaesthetic need to be ingested rapidly for effective response. Intake of sufficient quantities is facilitated if the birds are fasted or water is withheld. ~~Should~~ Birds must be examined to confirm death, and be ~~followed by~~ immediate kill~~ing~~ed by a secondary method if ~~birds~~ they are anaesthetised only.  ~~This method is suitable for confined poultry.~~  Carcasses should be disposed of in a manner that ensures they do not pose a risk to animals which may scavenge upon them.  **Rationale:**  As anaesthetics may cause only unconsciousness without death, it is important to identify animals that remain alive and apply a secondary killing process.  Secondary intoxication is a risk to scavenging animals that may ingest the carcasses  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

None identified

Article 7.6.25.

**General principles of modified atmosphere killing**

Modified atmosphere killing is performed by exposing animals to CO2, inert gases or their mixtures.

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| Australia | **Category:** Addition  **Proposed amended text**:  Modified atmosphere killing is performed by exposing animals to CO2, inert gases or their mixtures, or reducing oxygen availability through low pressure.  **Rationale:**  Suggested change toreflect the method of action of low atmospheric pressure. |

This can be performed either by placing the animals in a prefilled gas container, by placing transport modules or crates containing animals in a container and introducing a gas mixture, or by the gas being introduced into a poultry house.

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| Australia | **Category:** Addition  **Proposed amended text**:  This can be performed either by placing the animals in a prefilled gas container, by placing transport modules or crates containing animals in a container and introducing a gas mixture, or by the gas being introduced into a poultry house.  The use of specific gases affects the welfare outcomes associated with modified atmosphere killing.  Some gases may be irritant and aversive to animals, particularly at high concentrations (e.g. CO2). This can be reduced by gradually increasing the concentration, although this must be balanced against the overall increased time until unconsciousness.  Modified atmosphere killing includes a prolonged period of consciousness after commencement of the method, during which the animals experience any aversive effects associated with the gas used. Less aversive gases or techniques (e.g. through gradual increases in concentrations for poultry) should be used if possible.  **Rationale:**  Gases may cause adverse effects on animals. For example, CO2 may irritate mucous membranes, particularly at higher concentrations (over 40%) as well as causing hypercapnia as a result of CO2 build up in the bloodstream. EFSA and AVMA both recommend that concentrations be gradually increased for poultry.  **Supporting evidence, if relevant**  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen, S.S., Alvarez, J., Bicout, D.J., Calistri, P., Depner, K., Drewe, J.A., Garin‐Bastuji, B., Gonzales Rojas, J.L., Gortázar Schmidt, C. and Miranda Chueca, M.Á., 2019. Killing for purposes other than slaughter: poultry. *EFSA Journal*, *17*(11), p.e05850. |

Modified atmosphere killing can also be administered by using gas-filled foam, medium or low density water based foam or through low atmosphere pressure (LAPS).

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| Australia | **Category**: Deletion    **Proposed amended text:**    Modified atmosphere killing can also be administered by high expansion nitrogen foam ~~using gas-filled foam, medium or low density water based foam or through~~ low atmosphere pressure (LAPS).    **Rationale:**    Modified atmosphere killing means the composition of breathable air is altered and death results due to lack of oxygen (hypoxia) or the build-up of lethal gases such as carbon dioxide. The use of water-based, medium/low-density foam does not create a modified atmosphere—instead, the animals are killed by mechanical occlusion of the airway, so these options do not belong in Article 7.6.25. Similarly, high expansion nitrogen foam should be included.    **Supporting evidence:**  Raj, A. B., Smith, C., & Hickman, G. (2008). Novel method for killing poultry in houses with dry foam created using nitrogen. The Veterinary record, 162(22), 722–723. <https://doi.org/10.1136/vr.162.22.722>    McKeegan, D.E.F., H.G.M. Reimert, V.A. Hindle, P. Boulcott, J.M. Sparrey, C.M. Wathes, T.G.M. Demmers and M.A. Gerritzen. (2013) Physiological and behavioral responses of poultry exposed to gas-filled high expansion foam. Poultry Science 5(1):1145-1154. <https://pubmed.ncbi.nlm.nih.gov/23571322>  McKeegan, D. (2018). Mass Depopulation. In J.A. Mench (Ed.), *Advances in Poultry Welfare* (pp. 351–372). Woodhead Publishing. ISBN 978-0-08-100915-4. |

Article 7.6.26.

**Prefilled gas container**

This method is the exposure of batches of animals to high concentrations of gas in pre-filled containers which can also be waste bins, skips or bags.

In this method, animals are manually caught in small batches and dropped into the container connected to gas cylinders.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for poultry and mink. This method is the exposure of batches of animals to high concentrations of gas in pre-filled containers which can also be waste bins, skips or bags. This method is a suitable form of modified atmosphere killing because animals are expected to rapidly lose consciousness prior to dying.  In this method, animals are manually caught in small batches and ~~dropped~~ lowered, either directly or in transport units with good airflow, into the container connected to gas cylinders.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Further details on the mechanism of action are added for clarity and to assist decision makers.  Suggest using more appropriate language than‘dropping’ which could be interpreted literally. In addition, it is possible transport units containing animals could be lowered into gas-filled containers, which could help in reducing (although not entirely avoiding) the stress of handling in some circumstances. |

The time to onset of death is related to the concentration of the gas and the duration of the exposure, i.e. lower concentration requires longer exposure [Raj and Gregory, 1990a,b].

When animals are exposed to the gas individually or in small groups in a container, the equipment used should be designed, constructed, and maintained in such a way as to avoid injury to the animals and allow them to be observed.

1. Animal welfare concerns

Manual catching and handling of animals cause distress, especially when birds are carried in an inverted position.

If there is no immediate loss of consciousness. Inhalation of high concentrations of gas while conscious is painful and causes respiratory distress.

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| Australia | **Category**: Editorial and Addition    **Proposed amended text:**  If there is no immediate loss of consciousness, ~~I~~inhalation of high concentrations of certain types of gases such as carbon dioxide while conscious is painful and causes respiratory distress. Inert gases such argon and nitrogen cause no observable distress.  **Rationale:**  The first two sentences should be combined.  Additional information helps to make the distinction between the welfare implications of different types of gasses when animals are exposed to them for the purpose of killing.    **Supporting evidence:**    Raj, A. B. M., & Gregory, N. G. (1995). Welfare implications of the gas stunning of pigs 1. Determination of aversion to the initial inhalation of carbon dioxide or argon. *Animal welfare*, *4*(4), 273-280. <https://www.cambridge.org/core/journals/animal-welfare/article/welfare-implications-of-the-gas-stunning-of-pigs-1-determination-of-aversion-to-the-initial-inhalation-of-carbon-dioxide-or-argon/70E6679FAA1C833A71BEDDB0E75F6EDF>    Raj, A.; Gregory, N. (1996) Welfare implications of the gas stunning of pigs 2. Stress of induction of anaesthesia.  *Animal Welfare*, 5, 71–78. [www.cambridge.org/core/journals/animal-welfare/article/abs/welfare-implications-of-the-gas-stunning-of-pigs-2-stress-of-induction-of-anaesthesia/92D432AF98904278664BF3AC6864DC89](http://www.cambridge.org/core/journals/animal-welfare/article/abs/welfare-implications-of-the-gas-stunning-of-pigs-2-stress-of-induction-of-anaesthesia/92D432AF98904278664BF3AC6864DC89)    Raj, A.B.M., Sandilands, V., & Sparks, N.H.C. (2006) Review of gaseous methods of killing poultry on-farm for disease control purposes  *Veterinary Record*, 159, 229-235. <https://bvajournals.onlinelibrary.wiley.com/doi/abs/10.1136/vr.159.8.229>    Sandilands, V., Raj, A.B.M, Baker, L. and Sparks, N.H.C. (2011) Aversion of chickens to various lethal gas mixtures. *Animal Welfare*, 20:253-262. [www.cambridge.org/core/journals/animal-welfare/article/aversion-of-chickens-to-various-lethal-gas-mixtures/E5B17AADB372FCC24678721FD78F43FC](http://www.cambridge.org/core/journals/animal-welfare/article/aversion-of-chickens-to-various-lethal-gas-mixtures/E5B17AADB372FCC24678721FD78F43FC) |

The time and distance animals are carried depends on the location of the gas containers on the premises and on the type and size of the housings.

Overloading may lead to compression and suffocation caused by more animals being dropped into the container without a sufficient interval between two consequent batches of animals. In addition, each batch of animals dropped into the container will displace equal volume of gas into the atmosphere, which will result in fluctuating concentrations of gas.

Injection of cold gas directly to the animals causes hypothermia.

Verifying *death* while the animals are in the *container* is difficult.

1. Animal-based and other measures

Animal-based measures are difficult to assess due to container design and the presence of gas.

Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.~~  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex  Additional signs that indicate the absence of life include lack of breathing, heartbeat, or brain stem reflexes.  **Rationale:**  Some of the signs described as for an effective kill may only indicate unconsciousness. More detail is warranted for this important step. |

1. Recommendations

*Containers* should allow the required gas concentration to be maintained and accurately measured.

Each batch of birds dropped in the containers (one layer) should be allowed sufficient time to die before adding the next batch of birds [Webster and Collett, 2012].

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| Australia | **Category:** Addition and change  **Proposed amended text**:  Each batch of birds dropped lowered in the containers (one layer) should be allowed sufficient time to die before adding the next batch of birds [Webster and Collett, 2012].  Animals may remain in the gas until death is confirmed, or may be removed once unconscious and killed by a secondary killing method.  **Rationale:**  In some circumstances it may be preferable to use a secondary technique to kill the animals once they are unconscious.  Suggest using more appropriate language than‘dropping’ which could be interpreted literally. |

*Containers* should not be overcrowded and measures are needed to avoid animals suffocating by climbing on top of each other.

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| Australia | **Category:** Addition  **Proposed amended text**:  *Containers* should not be overcrowded and measures are needed to avoid animals suffocating by climbing on top of each other.  Containers should also be chosen that will not allow animals to escape (e.g. having sufficiently high sides of an appropriate material and design).  **Rationale:** even in the absence of adverse effects from the gases, some animals may try and climb out of containers if they are not adequately designed to prevent this, resulting in potential injuries and stress from recapture. |

Skilled catching teams are necessary.

This method is suitable for poultry and mink.

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~This method is suitable for poultry and mink.~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

Article 7.6.27.

**Gas introduced into a container**

1. Animal-based and other measures

Animal-based measures related to pain, fear and respiratory distress are head shaking, laboured breathing (gasping), escape attempts and high-pitched vocalisations.

Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.~~  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex  Additional signs that indicate the absence of life include lack of breathing, heartbeat, or brain stem reflexes.  **Rationale:**  Some of the signs described as for an effective kill may only indicate unconsciousness. More detail is warranted for this important step. |

Animal-based measures are difficult to assess due to container design and the presence of gas.

1. Recommendations

Birds should be caught gently and placed in crates or modules of appropriate size and at appropriate stocking densities to allow all birds to sit down. Pigs should also be moved gently and in small groups into the containers.

Containers should not be overcrowded and measures are needed to avoid animals suffocating by climbing on top of each other.

Containers should allow the required CO2 and inert gases concentrations to be maintained and accurately measured.

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| Australia | **Category:** Addition  **Proposed amended text**:  Containers should allow the required CO2 and inert gases concentrations to be maintained and accurately measured. They should also appropriately contain the animals (e.g. walls of sufficient height).  **Rationale:**  Animals may attempt to leave the container if stressed or startled, potentially causing more stress during recapture. |

Sufficient exposure time should be allowed for animals to die before the door is opened.

Each animal should be examined to ensure they are dead.

Any survivors should be killed without delay.

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| Australia | **Category:** Addition  **Proposed amended text**:  Any survivors should be killed using a backup killing method without delay.  **Rationale:**  Suggested edit for clarity |

Staff training to acquire knowledge and skills necessary to proper calibration of equipment and monitoring of gas concentrations and relevant exposure times, to ensure that containers are fit for the purpose, gas is vaporised before injection, the rate of injection is correct and temperature inside the chamber is monitored.

This method is suitable for poultry and pigs.

1. Species-specific recommendations

None identified

Article 7.6.28.

**Gas introduced into the barn or whole house gassing**

This method is the exposure of birds in their housing to an increasing gas concentration. In general, this means that the barn is equipped with gas measuring units and gas tubing for the injection of gas. The barn is closed, and ventilation and other openings are sealed. The gas is injected which results in a gradual increase of the Gas. In practice mainly CO2 is applied as this gas is most easy to apply and the desired concentration of >45% CO2 in the breathing air can be reached relatively quickly.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is the exposure of birds in their housing to an increasing gas concentration. In general, this means that the barn is equipped with gas measuring units and gas tubing for the injection of gas. The barn is closed, and ventilation and other openings are sealed. The gas is injected which results in a gradual increase of the Ggas. In practice mainly CO2 is applied as this gas is most easy to apply and the desired concentration of >45% CO2 in the breathing air can be reached relatively quickly. The use of nitrogen is also emerging as an alternative to CO2 that has the potential to provide better animals welfare outcomes as it is an inert gas, and could be used in the future once further evidence and guidance is available to support its use. Both CO2 and nitrogen can achieve an anoxic environment for depopulation relatively quickly.  **Rationale:**  The use of nitrogen gas is increasing and offers better welfare outcomes compared to CO2 due to its less aversive nature. Once further evidence e.g. peer reviewed literature, and practical guidance on implementation are available, it should be considered as an alternative to CO2.  **Supporting evidence, if relevant**  “A better means to a humane ending – nitrogen anoxia for mass depopulation of livestock” – Veterinary Association for Farm Animal Welfare (VFAW) - [VFAW webinar](https://www.youtube.com/watch?v=8ats0zN_gY4) |

1. Animal welfare concerns

There is no immediate loss of consciousness. Inhalation of increased concentrations of gas while conscious cause respiratory distress.

The induction of the gas makes noise and can lead to a fear response from the birds

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| Australia | **Category:** Addition  **Proposed amended text**:  The induction of the gas makes noise and can lead to a fear response from the birds.  Expansion of gases on release into the barn/shed may result in drops in temperatures severe enough to cause hypothermia  **Rationale:**  The release of compressed gas into the barn or shed may cause temperature decreases as it expands, which may be potentially significant if not managed. |

1. Animal-based and other measures

Animal-based measures are difficult to assess due to the presence of gas in the whole barn.

Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.

Gas concentrations should be monitored and used as a proxy for animal based measures

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.~~  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex  Additional signs that indicate the absence of life include lack of breathing, heartbeat, or brain stem reflexes.  Gas concentrations should be monitored and may assist in monitoring, however animals should also be monitored as much as possible during (e.g. using video feeds) and after the killing method. ~~and used as a proxy for animal based measures~~  **Rationale:**  Some of the signs described as for an effective kill may only indicate unconsciousness. More detail is warranted for this important step.  We also do not consider it acceptable to rely purely on monitoring of gas concentrations to determine the welfare status of the animals, instead of checking animals for signs of distress and of life during/after this process. |

1. Recommendations

The barns should be checked before starting the procedure to ensure they can be made air-tight enough for the required gas concentrations can be reached.

Staff entering the barn to prepare the gassing procedure should work calmly to minimize fear reactions from the birds.

Ventilation should be shut down as quickly as possible before starting the gas inlet.

Before removing the gas equipment but after ventilating the barn there should be a check on the effectiveness of the method.

The method is suitable for all poultry species.

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| Australia | **Category**: Addition  **Proposed amended text**:  The barns should be checked before starting the procedure to ensure they can be made air-tight enough for the required gas concentrations can be reached.  Staff entering the barn to prepare the gassing procedure should work calmly to minimize fear reactions from the birds.  Measures should be taken to minimise disturbance and stress associated with the release of gas into the area e.g. due to noise and temperature drops.  **Rationale:**  The release of gases into the barn/shed may cause loud noises or severe drops in temperature, which may negatively affect the welfare of the animals. Measures should be taken where possible to address these. |

1. Species-specific recommendations

None identified

Article 7.6.29.

**Water based foam**

Water based foam is a low to high density foam created with air. The principle is that animals in their housing or in a confined area are covered with a blanket of foam and that the animals will die due to occlusion of the airways leading to cessation of brain and heart activity (Benson et al 2009). Due to the density, the foam will not penetrate narrow openings or mesh wire structures. This method requires little human-animal interaction and has the capacity to effectively kill large numbers of animals.

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| Australia | **Category:** Change  **Proposed amended text**:  This method is applicable to poultry, cattle, pigs, and small ruminants. Water based foam is a low to high density foam created with air. The principle is that animals in their housing or in a confined area are covered with a blanket of foam. Low (expansion ratio of 2-20:1) and medium (expansion ratio (20-200:1) expansion foams, known as wet foams cause death ~~and that the animals will~~ ~~die~~ due to occlusion of the airways leading to cessation of brain and heart activity (Benson et al 2009). Due to the density, the foam will not penetrate narrow openings or mesh wire structures. This method requires little human-animal interaction and has the capacity to effectively kill large numbers of animals.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  Foam may be filled with a variety of gases, including air. Research has shown that air filled foam may be as effective as foam filled with CO2 in some circumstances, while nitrogen may lead to a shorter time to death.  **Supporting evidence, if relevant**  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

1. Animal welfare concerns

Animals do not immediately lose consciousness

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| Australia | **Category:** Addition  **Proposed amended text**:  Animals do not immediately lose consciousness. This time may be particularly prolonged in waterfowl that breath hold. As animals experience physical suffocation, they are likely to experience considerable distress prior to losing consciousness.  **Rationale:**  Waterfowl may breath hold and experience bradycardia, prolonging the time to unconsciousness.  In addition, as the mechanism of action is via physical occlusion of airways, this method may cause increased distress compared to some other atmosphere modification methods.  **Supporting evidence, if relevant**  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

Animals will experience distress as oxygen is lost from the environment.

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| Australia | **Category:** Change  **Proposed amended text:**  Animals will experience a period of distress as oxygen is lost from the environment as death occurs due to occlusion of the airways.  **Rationale:**  It is important to specify the reason why animals experience distress when water-based foam is used for killing because loss of oxygen from the environment is not the cause of the distress.  **Supporting evidence:**  Raj, A. B. M., Smith, C., & Hickman, G. (2008). Novel method for killing poultry in houses with dry foam created using nitrogen. *The Veterinary Record*, *162*(22), 722.  EFSA Panel on Animal Health and Welfare (AHAW), Nielsen SS, Alvarez J, et al. Welfare of pigs at slaughter. EFSA J. 2020;18(6):e06148. Published 2020 Jun 17. doi:10.2903/j.efsa.2020.6148  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

1. Animal-based and other measures

Animal based measures are difficult to assess once animals are covered in foam. Distress behaviours such as escape attempts and vocalizations (pigs) may be seen or heard.

Animal-based measures of an effective kill are: absence of signs of life such as breathing, righting reflex or body movement.

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.~~  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex  Additional signs that indicate the absence of life include lack of breathing, heartbeat, or brain stem reflexes.  **Rationale:**  Some of the signs described as for an effective kill may only indicate unconsciousness. More detail is warranted for this important step. |

1. Recommendations

The temperature of the foam is determined mainly by the temperature of the water. The temperature of water used should be between (15 and 20 °C).

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| Australia | **Category:** Addition  **Proposed amended text**:  The use of wet foam provides a poorer welfare outcome than the use of high expansion foams, as death occurs due to asphyxiation from physical occlusion of the airways. Other less aversive methods of killing should be used if possible.  The temperature of the foam is determined mainly by the temperature of the water. The temperature of water used should be between (15 and 20 °C).  **Rationale:**  Killing using wet foams (physical asphyxiation) results in a poorer welfare outcome for animals than some other methods, which should be made clear.  **Supporting evidence:**  Raj, A. B. M., Smith, C., & Hickman, G. (2008). Novel method for killing poultry in houses with dry foam created using nitrogen. *The Veterinary Record*, *162*(22), 722. |

The foam should be produced with foaming agents that are proven to be non-irritating and having no aversive effect.

Foam should be applied after animals are contained.

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| Australia | **Category:** Addition  **Proposed amended text**:  Foam should be applied after animals are contained. This may be within a container, or within a whole facility/shed if it is suitable to allow for foam use (e.g. lacking internal structures or cages that may prevent foam from completely surrounding animals).  **Rationale:**  Foams may be used in large open sheds or by introduction into a container within which animals are located  **Supporting evidence, if relevant**  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

Personnel should ensure that there is sufficient time allowed for each batch of animals to die before they are removed from the foam.

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| Australia | **Category**: Addition  **Proposed amended text**:  Personnel should ensure that there is sufficient time allowed for each batch of animals to die before they are removed from the foam.  Animals should be examined following removal from the foam to confirm death, and if necessary, a secondary killing method should be applied.  **Rationale:**  Death should be confirmed as soon as possible, so secondary measures can be taken if needed to avoid prolonged suffering. |

This method should only be applied to floor-reared animals.

This method is suitable for poultry, cattle, pigs, and small ruminants.

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| Australia | **Category**: Deletion  **Proposed amended text**:  This method is suitable for poultry, cattle, pigs~~,~~ ~~and small ruminants~~.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

None identified

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| Australia | **Category:** Change  **Proposed amended text**:  ~~None identified~~  This method is not recommended for waterfowl, which require a longer time in foam before unconsciousness and death.  **Rationale:**  Waterfowl may breath hold and take longer for unconsciousness and death to occur. |

Article 7.6.30.

**Gas infused high expansion foam**

A way to introduce a high gas concentration or to create a situation with very low O2 in containers or in buildings that are difficult to fill with gas is by using a high expansion foam filled with the gas. The most suitable gas is Nitrogen. The principle of the method is that animals are exposed to an environment of > 99% of N2 (or other gas) and die due to anoxia. The high gas concentration is achieved due to the foam being produced using a gas from a pure source instead of with air.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is suitable for poultry and pigs. This method is a suitable form of modified atmosphere killing because animals are expected to rapidly lose consciousness prior to dying.  High expansion foam, also known as ‘dry foam, includes foams with an expansion ratio of greater than 200:1.. A way to introduce a high gas concentration or to create a situation with very low O2 in containers or in buildings that are difficult to fill with gas is by using a high expansion foam filled with the gas. The most suitable gas is Nitrogen, however other gases such as CO2 may also be used.  The principle of the method is that animals are exposed to an environment of > 99% of N2 (or other gas) and die due to anoxia. The high gas concentration is achieved due to the foam being produced using a gas from a pure source instead of with air.  **Rationale**:  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  More clarity should be provided on the constitution of high expansion foams. |

Animals may be kept in their housing, in a confined area or in a special chamber or box. The building, confined area or box is then filled with gas-filled foam until the box is completely filled or the animals are well covered. As the bubbles burst the animals will breathe in an atmosphere containing only the gas released from the foam with less than 1% O2. This very low O2 concentration will induce a rapid loss of consciousness and death.

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| Australia | **Category:** Addition  **Proposed amended text**:  Animals may be kept in their housing, in a confined area or in a special chamber or box. The building, confined area or box is then filled with gas-filled foam until the box is completely filled or the animals are well covered. As the bubbles burst the animals will breathe in an atmosphere containing only the gas released from the foam with less than 1% O2, similar to hypoxia resulting from gassing without foam. This very low O2 concentration will induce a rapid loss of consciousness and death.  **Rationale:**  Additional clarity on the method of death is recommended. |

This method requires little human-animal interaction and has the capacity to effectively kill large numbers of animals however it does require specialized equipment.

1. Animal welfare concerns

Animals do not immediately lose consciousness

Animals will experience distress as oxygen is lost from the environment.

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| Australia | **Category**: Change  **Proposed amended text**:  Depending on the gas used within the high expansion foam, a~~A~~nimals ~~will~~ may experience distress as oxygen is lost from the environment.  **Rationale:**  High expansion-based foams are not designed to occlude the airways like water-based foam, therefore animals do not experience distress due to airway occlusion. In the case of inert gas foams (e.g. nitrogen), behavioural assessments suggest poultry do not show respiratory distress or aversion prior to death. They also do not appear to experience signs of hyperventilation before loss of consciousness like that which occurs when using CO2 methods. Current wording suggests that animals will definitely experience distress using this method and needs to be updated to reflect current science.  **Supporting evidence, if relevant:**  Hewitt, L. 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, pp. 1–46.  McKeegan, D.E.F., Reimert, H.G.M., Hindle, V.A., Boulcott, P., Sparrey, J.M., Wathes, C. M., Demmers, T.G.M., Gerritzen, M.A., (2013a). *Physiological and behavioural responses of poultry exposed to gas-filled high expansion foam*. Poult. Sci. 92, 1145-1154.  EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), Nielsen, S. S., Alvarez, J., Bicout, D. J., Calistri, P., Canali, E., Drewe, J. A., Garin-Bastuji, B., Gonzales Rojas, J. L., Gortázar, C., Herskin, M. S., Miranda Chueca, M. Á., Padalino, B., Roberts, H. C., Spoolder, H., Stahl, K., Velarde, A., Winckler, C., Viltrop, A., … Michel, V. (2024). *The use of high expansion foam for stunning and killing pigs and poultry*. *EFSA Journal*, 22(7), e8855. [**https://doi.org/10.2903/j.efsa.2024.8855**](https://doi.org/10.2903/j.efsa.2024.8855).  Animal Welfare Committee 2024, *Opinion on the Use of High Expansion Nitrogen Foam Delivery Systems for Depopulation of Poultry Flocks Affected by Notifiable Disease in the UK*, Department for Environment, Food and Rural Affairs, the Scottish Government, and the Welsh Government, pp. 1–20. Available at: <https://www.gov.wales/sites/default/files/publications/2024-06/animal-welfare-committee-opinion-use-high-expansion-nitrogen-foam-delivery-systems-depopulation-poultry-flocks-affected-by-notifiable-disease-uk.pdf> |

1. Animal-based and other measures

Animal based measures are difficult to assess once animals are covered in foam. Distress behaviours such as escape attempts and vocalizations (pigs) may be seen or heard.

Animal-based measures of an effective kill are: absence signs of life, such as breathing, righting reflex or body movement.

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| Australia | **Category:** Change  **Proposed amended text**:  ~~Animal-based measures of an effective kill are: absence of signs of life, such as breathing, righting reflex or body movement.~~  Signs of unconsciousness include: lack of body movement and righting reflex, absence of corneal or palpebral reflex  Additional signs that indicate the absence of life include lack of breathing, heartbeat, or brain stem reflexes.  **Rationale:**  Some of the signs described as for an effective kill may only indicate unconsciousness. More detail is warranted for this important step. |

1. Recommendations

The foam should be generated with gas from a pure source (preferable >98%).

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| Australia | **Category:** Addition  **Proposed amended text**:  The foam should be generated with gas from a pure source (preferable >98%). Foam with an expansion ratio of between 250:1 to 350:1 appears to provide optimal effectiveness and welfare. Some gases may provide better welfare outcomes than others  **Rationale:**  A ratio of 250:1-350:1 may provide the best balance between foam stability, bubble size and wetness. High expansion foam using certain gases (e.g. nitrogen) may be less aversive than others (e.g. CO2)  **Supporting evidence, if relevant**  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

The gas should be pre-heated to avoid freezing up the nozzles while the foam is generated.

The temperature of the foam is determined mainly by the temperature of the water therefore, the temperature of the water used should be between (15 and 20 °C)

The foam should be produced with a foam agents that is proven to be non-irritating and having no aversive effect.

Foam should be applied after animals are contained.

Personnel should ensure that there is sufficient time allowed for each batch of animals to die before they are removed from the foam.

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| Australia | **Category**: Addition  **Proposed amended text**:  Personnel should ensure that there is sufficient time allowed for each batch of animals to die before they are removed from the foam.  Animals should be examined following removal from the foam to confirm death, and if necessary, a secondary killing method should be applied.  **Rationale:**  Death should be confirmed as soon as possible, so secondary measures can be taken if needed to avoid prolonged suffering. |

This method is suitable for poultry and pigs.

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| Australia | **Category:** Deletion  **Proposed amended text**:  ~~This method is suitable for poultry and pigs.~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

None identified

Article 7.6.31.

**Low atmosphere pressure (LAPS)**

In this method, the birds are placed in crates or modules into a decompression chamber and are exposed to gradual decompression with a reduction of available oxygen to less than 5% [Martin et al., 2016a,b, c; Holloway and Pritchard, 2017].

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is applicable to poultry, specifically broiler chickens up to approximately 4kg liveweight. In this method, the birds are placed in crates or modules into a decompression chamber and are exposed to gradual decompression with a reduction of available oxygen to less than 5% [Martin et al., 2016a,b, c; Holloway and Pritchard, 2017]. This method requires specialised equipment that may not be widely available.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  it is important to note that specialised equipment is required, as regular decompression equipment may not be suitable |

When correctly applied, the LAPS procedure leads to loss of consciousness followed by death in all birds. The LAPS procedure does not induce immediate unconsciousness.

Mobile LAPS system can be used for on-farm killing.

1. Animal welfare concerns

No immediate onset of unconsciousness.

Rapid decompression and expansion of gases in the body cavity (i.e., sinuses, gut, or air sacs) can cause pain and respiratory distress. Furthermore, conscious birds might get injured from the convulsions of adjacent unconscious animals (i.e., strong wing flapping and leg paddling).

1. Animal-based and other measures

* Animal- based measures of aversion: escape attempts
* Animal base measures of unconsciousness: loss of posture; loss of posture; absence of movements; tonic-clonic convulsions (wing flapping)
* Animal-based measures of an effective kill are: absence of signs of life such as breathing, righting reflex or body movement.

1. Recommendations

During the first phase, the decompression rate shall not be greater than equivalent to a reduction in pressure from standard sea level atmospheric pressure 760 to 250 Torr for a period of not less than 50 seconds.

During the second phase, a minimum standard sea level atmospheric pressure of 160 Torr shall be reached within the following 210 seconds.

The pressure time curve shall be adjusted to ensure that all animals are irreversibly stunned within the cycle time.

The chamber should be leak tested and pressure gauges calibrated before each operational session and not less than daily during periods of use.

Low atmospheric pressure stunning equipment shall be designed and built to ensure a vacuum within the chamber enabling slow gradual decompression with reduction in available oxygen and holding at minimal pressure.

The system shall be equipped to measure , display and record continuously the absolute vacuum pressure, the time of exposure, the temperature, the humidity and to give a clearly visible and audible warning if the pressure deviates from the required levels. The device should be clearly visible to the personnel.

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| Australia | **Category:** Addition  **Proposed amended text**:  The system shall be equipped to measure, display and record continuously the absolute vacuum pressure, the time of exposure, the temperature, the humidity and to give a clearly visible and audible warning if the pressure deviates from the required levels. The device should be clearly visible to the personnel.  The equipment should ensure animals are visible (directly or via video) so they can be observed for signs of unconsciousness and death, and for the development of any welfare concerns.  **Rationale:**  Monitoring is an important part of any killing method and visibility has been identified as a key tool for mentoring welfare (Hewitt 2023).  **Supporting evidence, if relevant**  Hewitt, L 2023, *An independent animal welfare assessment of mass destruction methods for poultry on-farm*, report prepared for the Department of Agriculture, Fisheries and Forestry, Canberra, January. CC BY 4.0 |

Rate of decompression, duration of exposure, ambient temperature and humidity are key parameters.

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| Australia | **Category:** Addition  **Proposed amended text**:  Rate of decompression, duration of exposure, ambient temperature and humidity are key parameters. Rapid decompression is not acceptable.  **Rationale:**  As noted above, rapid decompression is associated with poor welfare (pain and suffering due to expansion of body gasses) and it should be made clear this is not acceptable (EFSA 2017, Underwood & Anthony 2020).  **Supporting evidence, if relevant**  EFSA Panel on Animal Health and Welfare (AHAW), More, S., Bicout, D., Bøtner, A., Butterworth, A., Calistri, P., Depner, K., Edwards, S., Garin‐Bastuji, B., Good, M. and Gortazar Schmidt, C., 2017. Low atmospheric pressure system for stunning broiler chickens. *EFSA Journal*, *15*(12), p.e05056.  Underwood, W. and Anthony, R., 2020. AVMA guidelines for the euthanasia of animals: 2020 edition. Available at https://www.avma.org/resources-tools/avma-policies/avma-guidelines-euthanasia-animals |

Emergency procedures associated with system failures should be included by the manufacturer in the manufacturer’s instructions for the use of the equipment.

This method is suitable for broiler chickens up to proximately 4kg liveweight.

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| Australia | **Category**: Deletion  **Proposed amended text**:  ~~This method is suitable for broiler chickens up to proximately 4kg liveweight.~~  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

1. Species-specific recommendations

None identified

Article 7.6.32

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| Australia | **Category**: General  **Comment**:  Australia has not approved the use of ventilation shut down with (or without) supplementation, noting the significant welfare concerns associated with its use. In particular, ventilation shut down without supplementation should not be used. The chapter should clarify the extreme circumstances under which it could be considered a method of last resort including that all other permitted killing methods have been explored and found impractical, and include a requirement for an animal welfare assessment to be conducted prior to its use. |

**Ventilation shut down with supplementation**

Ventilation shut down with supplementation such as active heating should not be routinely used and should be regarded as a method of last resort for poultry.

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| Australia | **Category:** Addition  **Proposed amended text**:  This method is a method of last resort, applicable to poultry. Ventilation shut down with supplementation such as active heating should not be routinely used and should be regarded as a method of last resort for poultry, where the risks associated with a delay in killing would outweigh the poor welfare outcomes associated with this method.  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article.  This method of killing provides very negative welfare outcomes, and additional information is suggested to provide guidance on what circumstances may justify its application.  **Supporting evidence, if relevant**  Animal Welfare Committee: Advice on emergency culling for the depopulation of poultry affected by high pathogenic avian influenza (HPAI) – consideration of ventilation shutdown (VSD) found at <https://assets.publishing.service.gov.uk/media/65eae0965b652445f6f21a98/Advice_on_emergency_culling_for_the_depopulation_of_poultry_affected_by_high_pathogenic_avian_influenza__HPAI____consideration_of_ventilation_shutdown__VSD_.pdf> |

The method requires shutting down ventilation in animal housings that rely on the ventilation system to maintain constant temperature and air quality. It is a measure that kills animals predominantly by heat stress and lack of fresh air. Active heating of the ambient air or increasing the humidity in the building during ventilation shut down will shorten time to death and increase the effectiveness of the method.

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| Australia | **Category**: Change  **Proposed amended text**:  The method requires shutting down ventilation in animal housings that rely on the ventilation system to maintain constant temperature and air quality. It is a measure that kills animals predominantly by ~~heat stress~~ hyperthermia ~~and lack of fresh air~~. Active heating of the ambient air or increasing the humidity in the building during ventilation shut down is required, to ~~will~~ shorten time to death and increase the effectiveness of the method.  **Rationale:**  Research suggests death occurs primarily due to hyperthermia.  Changes made to clarify VSD without supplementation should not be considered acceptable as it will prolong the time until death.  **Supporting evidence, if relevant**  AVMA Guidelines for the Depopulation of Animals: 2019 Edition |

This method can be effective at killing large numbers of animals with limited human-animal interaction and few resources. The effective implementation of the method can be challenging based on the ambient temperature at the facility and how well the facility can be sealed.

1. Animal welfare concerns

It can take a long time for animals to lose consciousness.

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| Australia | **Category**: Change  **Proposed amended text**:  It can take an extended ~~long~~ time (up to several hours) for animals to lose consciousness.  **Rationale:**  Additional information added for clarity and to ensure users of the method are aware that prolonged times are required. Research conducted by Eberle-Krish 2018 demonstrated that with added heat, the average to death time for VSD+ (heat) in laying hens was 2 hours. Zhao et al found animals remaining standing after 3.5 hours.  **Supporting evidence, if relevant**  Zhao, Y., Xin, H. and Li, L., 2019. Modelling and validating the indoor environment and supplemental heat requirement during ventilation shutdown (VSD) for rapid depopulation of hens and turkeys. *biosystems engineering*, *184*, pp.130-141.  Eberle-Krish, K.N., Martin, M.P., Malheiros, R.D., Shah, S.B., Livingston, K.A. and Anderson, K.E., 2018. Evaluation of ventilation shutdown in a multi-level caged system. *Journal of Applied Poultry Research*, *27*(4), pp.555-563. |

Animals will experience heat stress.

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| Australia | **Category**: Addition  **Proposed amended text**:  Animals will experience heat stress which is associated with prolonged suffering.  Poor implementation (e.g. due to poor sealing of the facility) will prolong the time to unconsciousness and death, resulting in worse welfare outcomes.  **Rationale:**  This detail is important in ensuring the method is performed effectively and to try and minimise time until death. |

2. Animal-based and other measures

Animal-based measures may only be assessed via video if available.

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| Australia | **Category**: Addition  **Proposed amended text**:  Animal-based measures may only be assessed via video if available. Once personnel can access the facility, animals should be individually assessed as soon as possible for loss of consciousness and/or death.  **Rationale:**  Death should be confirmed as soon as possible, so secondary measures can be taken if needed to avoid prolonged suffering. |

Animal- based measures of unconsciousness: Loss of posture, absence of movements.

Animal-based measures of an effective kill are: absence of signs of life such as breathing, righting reflex or body movement.

3. Recommendations

Ventilation shut down with supplementation should only be used as a method of last resort.

Facilities must be properly sealed. Facilities that cannot be sealed properly or have poor insulation should not be used, due to the inability to hinder airflow and maintain uniform in-house temperatures depending on the season, and prolonging even further time to loss of consciousness.

Supplemental heaters should be used to increase the temperature of the facility.

Temperatures should be monitored at various heights and locations in the facility and the temperature should exceed 120° F or 49° C.

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| Australia | **Category**: Addition  **Proposed amended text**:  Temperatures should be monitored at various heights and locations in the facility~~.~~ ~~And~~ t~~T~~he temperature should exceed 120° F or 49° C within 30 minutes and be maintained at that level for at least three hours.  Animals should be individually examined for signs of consciousness and/or death as soon as feasible once VSD is complete. Where animals are found alive (conscious or unconscious), a backup killing method should be applied as soon as possible to avoid prolonging suffering.  **Rationale:**  As per the AVMA and USDA recommendations, temperatures should be maintained for several hours to ensure maximum efficacy.  Death should be confirmed as soon as possible, so secondary measures can be taken if needed to avoid prolonged suffering  **Supporting evidence, if relevant**  AVMA Guidelines for the Depopulation of Animals: 2019 Edition |

Humidity should be monitored at various heights and locations in the facility.

This method is a method of last resort suitable for poultry.

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| Australia | **Category**: Deletion  **Proposed amended text**:  This method is a method of last resort suitable for poultry  **Rationale:**  As noted in general comments, we recommend the suitability for different species is listed at the start of the article. |

4. Species-specific recommendations

None identified