

USA Comments shown as either double underlined (new proposed text) or as strike-through (proposed text for deletion) and in royal blue font

CHAPTER 7.5.

SLAUGHTER OF ANIMALS

[Article 7.5.1.]

[Article 7.5.2.]

[Article 7.5.3.]

[Article 7.5.4.]

[Article 7.5.5.]

[Article 7.5.6.]

Article 7.5.7.

Stunning methods

1. [...]
2. [...]
3. Electrical stunning

a) mtry t[...]

b) Electrical stunning of birds using a waterbath

This section should be read in conjunction with Article 7.5.7.3 a) and with Article 7.5.7.5.

There should be no sharp bends or steep gradients in the shackle line and the shackle line should be as short as possible consistent with achieving acceptable line speeds, and ensuring that birds have settled by the time they reach the waterbath. A breast comforter can be used effectively to reduce wing flapping and calm birds. The angle at which the shackle line approaches the entrance to the waterbath, and the design of the entrance to the waterbath, and preventing the draining of excess 'live' water from the entry of the bath are all important considerations in ensuring birds are calm as they enter the bath, do not flap their wings, and do not receive pre-stun electric shocks.

Rationale: Pre-stun shocks are the result of birds contacting “live” water prior to immersion in the water-bath. It is important to prevent water overflow at the entrance to the water-bath to prevent pre-stunning.

In the case of birds suspended on a moving line, measures should be taken to ensure that the birds are not wing flapping at the entrance of the stunner. The birds should be secure in their shackle, but there should not be undue pressure on their shanks. The shackle size should be appropriate to fit the size of the shanks (metatarsal bones) of birds.

Birds should be hung on shackles by both legs.

Birds with dislocated or broken legs or wings should be humanely killed rather than shackled.

The duration between hanging on shackles and *stunning* should be kept to the minimum. In any event, the time between shackling and *stunning* should not exceed one minute.

Waterbaths for *poultry* should be adequate in size and depth for the type of bird being slaughtered, and their height should be adjustable to allow for the head of each bird to be immersed. The electrode immersed in the

bath should extend the full length of the waterbath. Birds should be immersed in the bath up to the base of their wings. Electrical shock before stunning should be prevented. The shackle-to-leg contact should be wetted preferably before the birds are inserted in the shackles. To improve the electrical contact for an effective stun, it is recommended that the shackle-to-leg contact be wetted immediately after bird entry into the stunning chamber. Additional salt (as a solution) should be added regularly to maintain a suitable constant concentration in the waterbath.

Rationale: The United States recommends that the contact area on the shackles **not** be wet prior to shackling. This can cause safety issues for personnel in the shackling area, as well as irritation from wet arms generating rashes on personnel. The contact area should instead be wet immediately after the birds enter the stunner (via automated foot spray or similar method) when their head contacts the water bath. Wetting feet or shackles prior to the stunner may also result in pre-stun shocks for birds before contact with the water bath.

The waterbath should be designed and maintained in such a way that when the shackles pass over the water, they are in continuous contact with the earthed rubbing bar.

The control box for the waterbath stunner should incorporate an ammeter which displays the total current flowing through the birds.

~~The shackle-to-leg contact should be wetted preferably before the birds are inserted in the shackles. In order to improve the electrical conductivity of the water, it is recommended that salt be added in the waterbath as necessary. Additional salt should be added regularly as a solution to maintain suitable constant concentrations in the waterbath.~~

~~The effectiveness of the stun depends on the interaction of several parameters in the stunning process such as current type (alternating current (AC) or direct current (DC), amperage, voltage, frequency, electrical wave form, electrical impedance, length and width of the live electrode, contact with the earth rail, depth of bird immersion and bird dwell time in the waterbath and the size, weight, and age of the birds. AC is more effective than DC at inducing unconsciousness. Higher frequencies require higher amperage for an effective stun.~~

~~The efficacy of the waterbath system is influenced by the species, number, and size of the birds passing through the waterbath. For example, when size and/or number of birds in the bath at any one time increase, the resistance also increases. Parallel paths of current also arise with increasing numbers of birds. In these cases, variable resistance can result in insufficient current to produce immediate unconsciousness. Therefore, the effectiveness of an electrical stunning system is dependent on the electrical variables used (i.e., waveform, current, voltage, frequency, and duration) as well as the biological factors of the bird (i.e., size, weight, sex, composition, and feather cover).~~

~~The biological variability of birds makes it difficult to construct recommendations for optimal parameters for electrical stunning of poultry at slaughter. Inadequate electrical variables can result in a return to consciousness before birds enter the neck slitter. However, use of electrical frequencies that are too high results in an increase in blood spotting, leading to larger amounts of carcass waste and an overall increase in the number of birds needed to yield the same amount of end product. Appropriate current, voltage and frequency settings are dependent upon the type of current and waveform used as well as the type of bird being stunned.~~

Rationale: Contrary to the European model, electrical stunning in the United States involves pulsed direct current with low current (25 to 45 mA/bird), low voltage (10 to 25 V), and high frequency (approx 500 Hz). This type of system became possible with advances in electrical circuitry and changes to the length of the water bath cabinet that increase dwell time of the birds and decrease the total resistance in the water bath. In a survey of 329 US poultry plants, 92.1% reported using electrical stunning and 77.4% of those plants used low-voltage (10 to 25 V), high-frequency (500 Hz) systems. Results of studies of birds stunned with the low voltage US model

indicate that the birds are unresponsive to stimuli as assessed by corneal and comb reflexes. Therefore, there is no sound scientific basis for concluding that sinusoidal AC is a superior option to the United States pulsed DC model.

References:

1. AVMA. AVMA Guidelines for the Humane Slaughter of Animals: 2016 Edition. In Press. *Attached*
2. Heath GE, Thaler AM, James WO. A survey of stunning methods currently used during slaughter of poultry in commercial poultry plants. J Appl Poult Res 1994;3:297–302.
3. Johnson CL. A review of bird welfare during controlled atmosphere and electrical water-bath stunning. J Am Vet Med Assoc 2014;245:60–68. *Attached*

The management of these parameters to ensure all birds are effectively stunned should be set out in standard operating procedures in the *slaughterhouse/abattoir's* dedicated plan for animal welfare, taking into account manufacturers' instructions and traceability concerns.

Rationale: The United States recommends deleting reference to traceability concerns as that is unrelated to this Article on Electrical Stunning of Birds Using a Waterbath.

As birds will have different impedances and are generally stunned in groups, the equipment should be adjusted so that the total current is the minimum required current per bird to achieve unconsciousness. The effective current for a particular *slaughterhouse/abattoir's* operation should be adjusted through monitoring specific indicators such as voltage, calculated amperage and frequency, and regular evaluation of indicators for welfare outcomes after birds have been stunned.

Rationale: The United States recommends that welfare indicators for stunning be measured in addition to voltage, amperage, and frequency.

Standard procedures should be implemented to ensure that small birds do not go on the line amongst bigger birds and that those small birds are stunned separately. In order to avoid mis-stunned birds, uniformity of bird size and bird weight is important to ensure that birds are stunned equivalently and efficiently in the waterbath. During shackling, small birds should not be placed on the same moving line with bigger birds. In order to avoid disruption of electrical stunning settings and variance in impedance of each bird, empty shackles should be avoided on the moving shackle line. Electrical stunning equipment is designed and calibrated to operate efficiently and effectively when all shackles are full.

Rationale: The United States is providing this clarifying language and additional content to improve animal welfare during waterbath stunning.

Using waterbaths, birds are stunned in groups and different birds will have different impedances. The voltage should be adjusted so that the total current is the required current per bird as shown in the table hereafter, multiplied by the number of birds in the waterbath at the same time. The following values have been found to be satisfactory when employing a 50 Hertz sinusoidal alternating current.

Birds should receive the current at least 4 seconds. While a lower current may also be satisfactory, in any case, the current shall should in any case be such as to ensure that unconsciousness occurs immediately and lasts until death by bleeding occurs the bird is braindead has been killed by cardiac arrest or by bleeding. When higher electrical frequencies are used, higher currents may be required.

Rationale: The United States supports outcome-based language as noted in the Guiding Principles of Chapter 7.1, Article 7.1.2.8. Also, the title of this Article is “Electrical stunning of birds using a waterbath”, not Electrical KILLING of birds using

a waterbath; hence the purpose of the waterbath is NOT to achieve a braindead bird, but rather to stun the bird prior to the application of a method that will kill the birds.

The following table shows the minimum average current required in experimental conditions according to frequency range for AC using a sinusoidal wave form.

<u>Frequency (Hz)</u>	<u>Minimum average current (milliamperes per bird)</u>			
	<u>Broilers</u>	<u>Turkeys</u>	<u>Layers (spent hens)</u>	<u>Ducks and geese</u>
<u>From 50 to 200 Hz</u>	<u>100 mA</u>	<u>250 mA</u>	<u>100 mA</u>	<u>130 mA</u>
<u>From 200 to 400 Hz</u>	<u>150 mA</u>	<u>400 mA</u>	<u>No data available</u>	<u>No data available</u>
<u>From 400 to 1500 Hz</u>	<u>200 mA</u>	<u>400 mA</u>	<u>No data available</u>	<u>No data available</u>

General comment: Regarding the chart above on the Minimum average current (milliamperes per bird) versus Frequency (Hz), the chart should include similar data for AC using a rectangular wave form and for the United States pulsed DC model. Inclusion of this text and table in this standard without providing similar guidance for other current types and waveforms that can produce an effective stun is biased and misleading. When appropriate current, voltage, and frequency settings based on the current type and waveform are used, an effective stun can be achieved.

The use of other wave forms, current, amperage and voltage combinations should be scientifically validated to demonstrate effective stunning (immediate onset of unconsciousness until death) prior to implementation.

Rationale: The United States is not aware of any other OIE standard that requires it be “scientifically validated” prior to adoption.

The means of assessing the welfare outcomes of the stunning process should also be set out in the standard operating procedures in the slaughterhouse/abattoir’s plan for animal welfare. The effectiveness of stunning should also be regularly monitored by assessing the following indicators and their corresponding outcomes of consciousness at two key stages: (a) between the exit from the waterbath stunner and neck cutting and (b) during bleeding immediately post-neck cutting when bleeding starts. It is better if bird welfare monitoring is focused on detecting consciousness. A list of selected indicators is proposed to check for signs of consciousness for a set number of birds or a set time period to monitor the birds in these two key areas. The staff responsible for welfare outcome monitoring should choose the most appropriate set of indicators (more than one, but as many as practical) from the list according to their expertise and the available infrastructure in the slaughterhouse/abattoir. Assessment using a single indicator may be misleading. Multiple indicators should be assessed in order to reach a reliable conclusion. Ideally, at any time after application of an electric current, birds should not display signs of consciousness. In any event the number of indicators used must demonstrate the required welfare outcome.

Rationale: Given modern plant design, it may not be possible to observe the entirety of the bleeding process. Instead, it is recommended that the birds immediately post-neck cutting be observed to ensure bleeding has begun. It is recommended that a set number of birds be observed from stunning to neck-cutting, and immediately post-neck cutting, to check for system efficacy.

Indicators to confirm unconsciousness at slaughter are as follows:

- a) presence of tonic seizures

- b) absence of rhythmic breathing
- c) absence of spontaneous blinking
- ~~d) absence of corneal or palpebral reflex~~
- e) absence of vocalisation
- f) absence of wing flapping
- ~~g) absence of spontaneous swallowing~~
- ~~h) absence of head shaking~~
- i) head is down/absence of neck tension

Rationale: A reference list is requested for the indicators of unconsciousness. Some indicators listed are not practical to verify with lines in motion. Other indicators that are commonly used during welfare audits in a processing plant are not included. The list may also vary depending on the electrical level used and intended outcome. Related to the listed indicators: The palpebral reflex is equivalent to blinking. Point f) "absence of wing flapping" removes potential to help reduce internal damage by running high frequency which causes more wing flapping. Further, at high levels of current and low frequency you don't have presence of tonic seizures in every bird because some will be dead coming out of the stunner cabinet. Points g) "absence of spontaneous swallowing" and h) "absence of head shaking" are subjective and not possible to judge at typical line speeds. We recommend adding the indicator: "i) head is down/absence of neck tension" as this is a commonly used and referenced indicator. We additionally recommend prioritizing this indicator in the "top 3".

The first three indicators in the list (tonic seizures, absence of rhythmic breathing, absence of spontaneous blinking) are considered the most important and practical indicators before exsanguination.

If the indicator shows that an effective stun is not being delivered then the operator should take immediate corrective action by adjusting the stun parameters to ensure birds are rendered immediately unconscious until death by bleeding occurs. In case of repetitive failure, the management of the slaughterhouse/abattoir should develop an improvement plan.

Indicators b) and f) (absence of rhythmic breathing, absence of wing flapping) are considered the most important and practical indicators during bleeding.

Every effort shall be made to ensure that no conscious or live birds enter the scalding tank.

In the case of automatic systems, until fail-safe systems of stunning and bleeding have been introduced, whatever cutting system is used, a manual back-up system should be in place to ensure complete severance of the carotid arteries, blood vessels so that death will occur from bleeding that any birds which have missed the waterbath stunner and/or the automatic neck-cutter are immediately stunned and/or killed immediately, and they are dead before entering scald tank.

Rationale: The United States recommends replacing "carotid arteries" with "blood vessels so that death will occur from bleeding", as death may be achieved by cutting of the carotid arteries, or cutting of the carotid and jugular arteries.

No conscious or live birds should enter the scalding tank.

A sampling and monitoring programme to demonstrate that the relevant welfare outcomes are attained should be developed and included into the dedicated plan for animal welfare of the slaughterhouse/abattoir (Article 7.5.2, point 1). To lessen the number of birds that have not been effectively stunned reaching neck cutters,

steps should be taken to ensure that small birds do not go on the line amongst bigger birds and that these small birds are stunned separately. The height of the waterbath stunner should be adjusted according to the size of birds to ensure even the small birds are immersed in the water bath up to the base of the wings.

Waterbath *stunning* equipment should be fitted with a device which displays and records the details of the electrical key parameter.

Minimum current for stunning poultry when using 50Hz is as follows:

Species	Current (milliamperes per bird)
Broilers	100
Layers (spent hens)	100
Turkeys	150
Ducks and geese	130

Minimum current for stunning poultry when using high frequencies is as follows:

Frequency (Hz)	Minimum current (milliamperes per bird)	
	Chickens	Turkeys
From 50 to 200 Hz	100 mA	250 mA
From 200 to 400 Hz	150 mA	400 mA
From 400 to 1500 Hz	200 mA	400 mA

4. [...]

5. [...]

[Article 7.5.8.]
