

## ANNEX I

**LIST OF STUNNING METHODS AND RELATED SPECIFICATIONS**(as referred to in Article 4)

## CHAPTER I

**Methods***Table 1 —**MECHANICAL METHODS*

<b>No</b>	<b>Name</b>	<b>Description</b>	<b>Conditions of use</b>	<b>Key parameters</b>	<b>Specific requirements for certain methods — Chapter II of this Annex</b>
1	Penetrative captive bolt device	Severe and irreversible damage of the brain provoked by the shock and the penetration of a captive bolt. Simple stunning.	All species. Slaughter, depopulation and other situations.	Position and direction of the shot. Appropriate velocity, exit length and diameter of bolt according to animal size and species. Maximum stun to stick/kill interval(s).	Not applicable.
2	Non-penetrative captive bolt device	Severe damage of the brain by the shock of a captive bolt without penetration. Simple stunning.	Ruminants, poultry, rabbits and hares. Slaughter only for ruminants. Slaughter, depopulation and other situations for poultry, rabbits and hares.	Position and direction of the shot. Appropriate velocity, diameter and shape of bolt according to animal size and species. Strength of the cartridge used. Maximum stun to	Point 1.

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				stick/kill interval(s).	
3	Firearm with free projectile	Severe and irreversible damage of the brain provoked by the shock and the penetration of one or more projectiles.	All species. Slaughter, depopulation and other situations.	Position of the shot. Power and calibre of the cartridge. Type of projectile.	Not applicable.
4	Maceration	Immediate crushing of the entire animal.	Chicks up to 72 hours and egg embryos. All situations other than slaughter.	Maximum size of the batch to be introduced. Distance between the blades and speed of rotation. Measure to prevent overloading.	Point 2.
5	Cervical dislocation	Manual or mechanical stretching and twist of the neck provoking cerebral ischemia.	Poultry up to 5 kg live weight. Slaughter, depopulation and other situations.	Not applicable.	Point 3.
6	Percussive blow to the head	Firm and accurate blow to the head provoking severe damage to the brain.	Piglets, lambs, kids, rabbits, hares, fur animals and poultry up to 5 kg live weight. Slaughter, depopulation and other situations.	Force and location of the blow.	Point 3.

Table 2 —

*ELECTRICAL METHODS*

No	Name	Description	Conditions of use	Key parameters	Specific requirements
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					<b>of Chapter II of this Annex</b>
1	Head-only electrical stunning	Exposure of the brain to a current generating a generalised epileptic form on the electroencephalogram (EEG). Simple stunning.	All species. Slaughter, depopulation and other situations.	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Minimum time of exposure. Maximum stun-to-stick/kill interval(s). Frequency of calibration of the equipment. Optimisation of the current flow. Prevention of electrical shocks before stunning. Position and contact surface area of electrodes.	Point 4.
2	Head-to-Body electrical stunning	Exposure of the body to a current generating at the same time a generalised epileptic form on the EEG and the fibrillation or the stopping of the heart. Simple stunning in case of slaughter.	All species. Slaughter, depopulation and other situations.	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Minimum time of exposure. Frequency of calibration of the equipment. Optimisation of the current flow.	Point 5.

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				Prevention of electrical shocks before stunning. Position and contact surface area of electrodes. Maximum stun-to-stick interval(s), in case of simple stunning(s).	
3	Electrical waterbath	Exposure of the entire body to a current generating a generalised epileptic form on the EEG and possibly the fibrillation or the stopping of the heart through a waterbath. Simple stunning except where frequency is equal to or less than 50 Hz.	Poultry. Slaughter, depopulation and other situations.	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Frequency of calibration of the equipment. Prevention of electrical shocks before stunning. Minimising pain at shackling. Optimisation of current flow. Maximum shackle duration before the waterbath. Minimum time of exposure for each animal. Immersion of the birds up to the base of the wings. Maximum stun-to-stick/kill interval(s)	Point 6.

				for frequency over 50 Hz(s).
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Table 3 —

## GAS METHODS

No	Name	Description	Conditions of use	Key parameters	Specific requirements of Chapter II of this Annex
1	Carbon dioxide at high concentration	Direct or progressive exposure of conscious animals to a gas mixture containing more than 40 % carbon dioxide. The method may be used in pits, tunnels, containers or building previously sealed. Simple stunning in case of slaughter of pigs.	Pigs, mustelids, chinchillas, poultry except ducks and geese. Slaughter only for pigs. Other situations than slaughter for poultry mustelids, chinchillas, pigs.	Carbon dioxide concentration. Duration of exposure. Maximum stun-to-stick interval(s) in case of simple stunning. Quality of the gas. Temperature of the gas.	Point 7. Point 8.
2	Carbon dioxide in two phases	Successive exposure of conscious animals to a gas mixture containing up to 40 % of carbon dioxide, followed when animals have lost consciousness, by a higher concentration	Poultry Slaughter, depopulation and other situations	Carbon dioxide concentration. Duration of exposure. Quality of the gas. Temperature of the gas.	Not applicable.

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3	Carbon dioxide associated with inert gases	<p>of carbon dioxide.</p> <p>Direct or progressive exposure of conscious animals to a gas mixture containing up to 40 % of carbon dioxide associated with inert gases leading to anoxia. The method may be used in pits, bags, tunnels, containers or in buildings previously sealed. Simple stunning for pigs if the duration of exposure to at least 30 % of carbon dioxide is of less than 7 minutes. Simple stunning for poultry if the overall duration of exposure to at least 30 % of carbon dioxide is of less than 3 minutes.</p>	Pigs and poultry. Slaughter, depopulation and other situations.	Carbon dioxide concentration. Duration of exposure. Maximum stun-to-stick/kill interval(s) in case of simple stunning. Quality of the gas. Temperature of the gas. Oxygen concentration.	Point 8.
4	Inert gases	Direct or progressive exposure of conscious animals to a inert gas mixture such	Pigs and poultry. Slaughter, depopulation and other situations.	Oxygen concentration. Duration of exposure. Quality of the gas.	Point 8.

		as Argon or Nitrogen leading to anoxia. The method may be used in pits, bags, tunnels, containers or in buildings previously sealed. Simple stunning in case of the slaughter of pigs. Simple stunning for poultry if the duration of exposure to anoxia is of less than 3 minutes.		Maximum stun-to-stick/kill interval(s) in case of simple stunning. Temperature of the gas.	
5	Carbon monoxide (pure source)	Exposure of conscious animals to a gas mixture containing more than 4 % of carbon monoxide.	Fur animals, poultry and piglets. Other situations than slaughter.	Quality of the gas. Carbon monoxide concentration. Duration of exposure. Temperature of the gas.	Points 9.1, 9.2 and 9.3.
6	Carbon monoxide associated with other gases	Exposure of conscious animals to a gas mixture containing more than 1 % of carbon monoxide associated with other toxic gases.	Fur animals, poultry and piglets. Other situations than slaughter.	Carbon monoxide concentration. Duration of exposure. Temperature of the gas. Filtration of the gas produced from engine.	Point 9.

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Table 4 —

**OTHER METHODS**

<b>No</b>	<b>Name</b>	<b>Description</b>	<b>Conditions of use</b>	<b>Key parameters</b>	<b>Specific requirements of Chapter II of this Annex</b>
1	Lethal injection	Loss of consciousness and sensibility followed by irreversible death induced by the injection of veterinary medicines.	All species. Other situations than slaughter.	Type of injection. Using approved medicines.	Not applicable.

**CHAPTER II****Specific requirements for certain methods**1. *Non-penetrative captive bolt device*

When using this method business operators shall pay attention to avoid the fracture of the skull.

This method shall only be used for ruminants of less than 10 kg of live weight.

2. *Maceration*

This method shall provide instantaneous maceration and immediate death of the animals. The apparatus shall contain rapidly rotating mechanically operated killing blades or expanded polystyrene projections. The capacity of the apparatus shall be sufficient to ensure that all animals are killed instantaneously, even if they are handled in a large number.

3. *Cervical dislocation and percussive blow to the head*

These methods shall not be used as routine methods but only where there are no other methods available for stunning.

These methods shall not be used in slaughterhouses except as a back-up method for stunning.

No person shall kill by manual cervical dislocation or percussive blow to the head more than seventy animals per day.

Manual cervical dislocation shall not be used on animals of more than three kg live weight.

4. *Head-only electrical stunning*

4.1. When using head-only electrical stunning, electrodes shall span the brain of the animal and be adapted to its size.



- 4.2. Head-only electrical stunning shall be carried out in accordance with the minimum currents set out in Table 1.

Table 1 —

*MINIMUM CURRENTS FOR HEAD-ONLY ELECTRICAL STUNNING*

<b>Category of animals</b>	<b>Bovine animals of 6 months or older</b>	<b>Bovine animals less than 6 months</b>	<b>Animals of ovine and caprine species</b>	<b>Animals of porcine species</b>	<b>Chicken</b>	<b>Turkeys</b>
Minimum current	1,28 A	1,25 A	1,0 A	1,3 A	240 mA	400 mA

5. *Head-to-body electrical stunning*

- 5.1. Animals of the ovine, caprine and porcine species.

The minimum currents for head-to-body electrical stunning shall be 1 ampere for sheep and goats and 1,30 amperes for pigs.

- 5.2. Foxes

Electrodes shall be applied to the mouth and rectum with a current of a minimum value of 0,3 amperes and a minimum voltage of 110 volts for at least three seconds.

- 5.3. Chinchillas

Electrodes shall be applied ear to tail with a current of a minimum value of 0,57 amperes for at least 60 seconds.

6. *Electrical waterbath stunning of poultry*

- 6.1. Animals shall not be shackled if they are too small for the waterbath stunner or if shackling is likely to induce or increase the pain suffered (such as visibly injured animals). In these cases, they shall be killed by an alternative method.
- 6.2. Shackles shall be wet before live birds are shackled and exposed to the current. Birds shall be hung by both legs.
- 6.3. For animals referred to in Table 2, waterbath stunning shall be carried out in accordance with the minimum currents laid down therein, and animals shall be exposed to that current for a minimum duration of at least four seconds.

Table 2 —

*ELECTRICAL REQUIREMENTS FOR WATERBATH STUNNING EQUIPMENT*

(average values per animal)

<b>Frequency (Hz)</b>	<b>Chickens</b>	<b>Turkeys</b>	<b>Ducks and geese</b>	<b>Quails</b>
< 200 Hz	100 mA	250 mA	130 mA	45 mA

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From 200 to 400 Hz	150 mA	400 mA	Not permitted	Not permitted
From 400 to 1 500 Hz	200 mA	400 mA	Not permitted	Not permitted

7. *Carbon dioxide at high concentration*

In the case of pigs, mustelids and chinchillas, the minimum concentration of 80 % of carbon dioxide shall be used.

8. *Carbon dioxide, use of inert gases or a combination of those gas mixtures*

Under no circumstances shall gases enter into the chamber or the location where animals are to be stunned and killed in a way that it could create burns or excitement by freezing or lack of humidity.

9. *Carbon monoxide (pure source or associated with other gases)*

- 9.1. Animals shall be kept under visual supervision at all times.
- 9.2. They shall be introduced one by one, and it shall be ensured that before the next animal is introduced the previous one is unconscious or dead.
- 9.3. Animals shall remain in the chamber until they are dead.
- 9.4. Gas produced by an engine specially adapted for the purpose of killing of animals may be used provided that the person responsible for killing has previously verified that the gas used:
  - (a) has been suitably cooled;
  - (b) has been sufficiently filtered;
  - (c) is free from any irritant component or gas.

The engine shall be tested every year before the killing of animals takes place.

- 9.5. Animals shall not be placed in the chamber until the minimum concentration of carbon monoxide has been reached.