COUNCIL OF EUROPE
COMMITTEE OF MINISTERS

RECOMMENDATION No. R (91) 7

OF THE COMMITTEE OF MINISTERS TO MEMBER STATES

ON THE SLAUGHTER OF ANIMALS

(Adopted by the Committee of Ministers on 17 June 1991
at the 460th meeting of the Ministers' Deputies)

The Committee of Ministers, under the terms of Article 15.*b* of the Statute of the Council of Europe,

Aware that man has a moral obligation to respect all animals and to have due consideration for their capacity for suffering;

Convinced that animals can be slaughtered without causing them undue fear, distress, suffering and pain;

Recalling the adoption of common provisions, laid down in the European Convention for the Protection of Animals for Slaughter concluded in 1979;

Motivated by the desire to safeguard, as far as possible, animals for slaughter from unnecessary suffering;

Anxious to encourage full respect for the provisions of the convention by all people directly involved in the slaughter of animals in the member states;

Considering that the Code of Conduct for the Slaughter of Animals as reproduced in the appendix to this recommendation constitutes a series of guidelines, the implementation of which can reduce fear, distress, suffering and pain of animals before they are killed,

Recommends to the governments of the member states:

i. if they have not already done so, to sign and/or ratify at their earliest convenience the European Convention for the Protection of Animals for Slaughter;

ii. to ensure that animals slaughtered outside or inside slaughter-houses are spared any avoidable pain or suffering, in particular by making certain of the skill of persons who are professionally engaged in the restraint, stunning and slaughter of animals;

iii. to ensure that the location, design, construction and facilities of slaughterhouses and their operation shall be such as to ascertain that the appropriate conditions provided for in this convention are complied with in order to spare animals any avoidable excitement, pain or suffering;

iv. for that purpose, to promote further research to develop methods and systems which cause less suffering and distress to animals for slaughter, in particular methods for the stunning of poultry with gas;

v. to ensure that adequate publicity is given to the Code of Conduct for the Slaughter of Animals, in particular amongst the persons concerned with slaughter;

vi. to encourage these persons to take account of the guidelines set out in the code of conduct when they prepare or carry out slaughter;

vii. if they authorise slaughter in accordance with religious rites without prior stunning, to take all possible measures to protect the welfare of the animals concerned by ensuring that such slaughter is carried out in appropriate slaughterhouses by trained personnel, who observe as far as possible the provisions in the code of conduct.

Appendix to Recommendation No. R (91) 7

CODE OF CONDUCT FOR THE SLAUGHTER OF ANIMALS

General statement

Every effort shall be made to ensure the welfare of the animals until they are dead.

The guidelines in this code of conduct apply to those domestic animals commonly slaughtered in slaughterhouses, that is, cattle, pigs, sheep, goats, domestic solipeds, rabbits and poultry. Other animals, even if they have been reared on farms, should not be slaughtered in slaughterhouses unless their transport, lairaging, restraint and slaughter can be carried out without causing undue distress to the animals.

I. Personnel

I.1. *Qualifications*

Persons engaged in the unloading, moving, lairaging, care, restraining, stunning and bleeding of animals play an important role in the welfare of these animals. For this reason there must be a sufficient number of personnel, who must be patient, considerate, competent, trained and familiar with the provisions in this code of conduct and in domestic legislation.

I.2. *Supervision*

The management of the slaughterhouse and the competent veterinary authorities must ensure that slaughterhouse staff carry out their tasks in accordance with the principles of animal welfare. If necessary, staff shall be retrained or replaced.

II. Animal behaviour

Personnel should be experienced in handling and moving farm livestock and understand the behaviour patterns of the animals.

The behaviour of individual animals or groups of animals will vary to some extent, depending on their breed, sex and age and the way in which they have been reared. Despite these differences, the following behaviour patterns which are always present to some degree in domestic animals, should be taken into consideration:

II.1. *Herding*

Most animals belonging to domestic livestock are kept in herds and follow a leader by instinct. In free-moving animals herding and following behaviour can be exploited by keeping animals for slaughter as far as possible in the groups in which they were reared.

Animals which are unaccustomed or hostile to each other should not be mixed at slaughterhouses.

II.2. *Positioning*

To control their personal space, cattle, sheep, pigs and horses try to maintain a certain distance from other animals in a group. For this reason, they strongly prefer when penned to stand beside a wall rather than in the centre.

II.3. *Distance*

Domestic animals will try to escape if a handler approaches closer than a certain distance. This critical distance varies between individual animals and depends upon their previous contact with humans and the possibilities which the slaughterhouse offers the animals to hide. It ranges from about one metre for animals which have been kept in confinement to a far greater distance for animals kept in free range systems. Sudden penetration of this zone by humans may cause a panic reaction and should be avoided.

II.4. *Vision*

Domestic animals have wide-angle vision (cattle, horses and sheep 340°, pigs 310°) but only have binocular vision for about 25° to 50° ahead of them, with poor perception of depth. This means that they can detect objects and movements beside and behind them, but can only judge distances directly ahead.

II.5. *Smell*

Although all domestic animals have a highly sensitive sense of smell, they react in different ways to the smells of slaughterhouses.

II.6. *Hearing*

Domestic animals can hear over a greater range of frequencies than humans and are more sensitive to higher frequencies. They tend to be alarmed by constant loud noise and by sudden noises, which may cause them to panic.

III. **Moving, handling and unloading**

The moving, handling and unloading of animals within a slaughterhouse shall be carried out with care. When persuasion is used it should be the minimum necessary to achieve the desired result.

The following considerations are important:

III.1. *Moving*

III.1.1. *Attitude.* The most common faults of inexperienced handlers are to try to make the animals move too quickly and in too great numbers. Animals must be handled calmly as they are more likely to be willing to be led or driven when treated in this way than if excited, and this will result in less stress on animals and personnel.

III.1.2. *Clearance.* Before attempting to move animals forward it is necessary to ensure that the way ahead is clearly visible to the animal, and free of all obstacles.

III.1.3. *Guidance.* When animals are moved their gregarious instincts shall be exploited and the leading animal shall be encouraged to go ahead. If necessary animals should be led individually. When appropriate, gates on rollers, guiding boards or other suitable means can be used in accordance with the provisions in Chapter III.4 hereafter.

III.1.4. *Lighting.* Animals move more readily from a darker area into a well-lit area. In particular, the light in passageways should be maintained at an appropriate level and care must be taken not to dazzle the animals.

III.2. *Handling*

Activities which may frighten, injure or cause agitation to animals must be avoided. The following practices shall not be allowed:

III.2.1. *Violence.* Violence must never be used. In particular, animals may never be hit on, nor shall pressure be applied to, particularly sensitive parts of their body. It is prohibited to crush, twist or break animals' tails, to grasp their eyes, to pull them by their ears and to inflict blows or kicks..

III.2.2. *Lifting.* Animals shall not be lifted by the head, horns, legs, feet, ears, tail or fleece, except in case of emergency.

III.3. *Unloading*

III.3.1. *Protection.* Animals shall be unloaded as soon as possible after arrival at the slaughterhouse. If delay in unloading is unavoidable the animals shall be protected from extremes of weather and provided with adequate ventilation. If they are not slaughtered immediately after unloading, they shall be lairaged.

Animals which have been transported in cages, baskets or crates shall be slaughtered immediately on arrival, or, when this is not possible, within at least three hours; they do not need to be lairaged.

Poultry awaiting slaughter shall be kept dry.

III.3.2. *Measures.* Unloading is one of the activities during which injuries and stress are most likely to occur.

To reduce these risks, the following measures should be taken:

III.3.2.1. *Time.* Animals must be given sufficient time to leave the vehicle quietly and without being excited.

III.3.2.2. *Facilities.* Unloading shall take place by means of a properly constructed ramp, bridge, gangway or lift, though appropriate manual lifting is permissible if the animals are small enough, and even desirable in the case of young animals which might have difficulty in negotiating a ramp.

III.3.2.3. *Security.* All unloading facilities should be suitable for their purpose, stable and maintained in a good state of repair. They shall be fitted with side railings or some other means of protection to prevent animals from falling off them. They shall be of a non-slip design. Foot battens of an appropriate design and spacing and a sufficient covering of sand or litter may be used as necessary.

III.3.2.4. *Incline.* For unloading, horizontal or ascending ramps are preferable; in any case the slope shall not exceed 20°.

III.3.2.5. *Containers.* Containers in which animals are transported shall be handled with care. They shall not be thrown to the ground or knocked over and shall preferably be unloaded by mechanical means and maintained in a horizontal position. If delay in removing the animals from the containers is unavoidable, the animals shall be protected from extremes of weather and provided with adequate ventilation. When removing animals from containers care shall be taken to prevent injuries; where appropriate, animals shall be taken out individually.

III.3.3. *Casualty slaughter.* If on arrival at the slaughterhouse an animal is found to be injured, or is in pain for any other reason, and cannot be unloaded from a vehicle without being caused pain, it must be slaughtered or killed on the vehicle without undue delay. If an animal is in pain elsewhere in the slaughterhouse it must be slaughtered or killed without delay and if an animal would be caused pain if it were moved it must be slaughtered or killed on the spot without delay. For this purpose, it is desirable that adequate transport equipment be available to convey the animals thus slaughtered or killed to the slaughterroom.

III.4. *Guiding instruments*

When it becomes necessary to use instruments such as sticks, crops or goads, these may be used only for the purpose of guiding animals. The following restrictions should be applied to their use:

III.4.1. *Instruments.* Instruments must not be used in a manner which causes animals unnecessary pain or suffering.

In particular, instruments shall not be used on any particularly sensitive part of the body.

III.4.2. *Goads.* Electric goads should be manufactured so as to cause the least possible discomfort to the animals; they shall be designed in such a way that the shock does not last for more than half a second. They may be used only on the hindquarters of bovines older than six months and on pigs, as sparingly as possible, and only on an animal which is free to move forward and is refusing to do so. Endeavours should be made to avoid the use of goads.

IV. Lairage design and construction

IV.1 *Design principles*

IV.1.1. *General.* The lairage should be designed to hold in acceptable conditions the maximum number of animals in relation to the throughput of the slaughterhouse.

In order to permit operations to be conducted as smoothly and efficiently as possible without injury or undue stress to the animals, the lairage area should be designed and constructed so as to allow the animals to move freely in the required direction, using their behavioural characteristics and without undue penetration of their flight zone.

The following guidelines may help to achieve this.

IV.1.2. *Layout.* The lairage should be designed to allow a one-way flow of animals from unloading to the point of slaughter, without any abrupt corners to negotiate.

IV.1.3. *Inspection.* Pens, passageways and races must be arranged in such a way as to permit inspection of any animal at any time, and to permit the removal of sick or injured animals for which separate appropriate accommodation must be provided.

IV.2. *Accommodation*

Each animal shall have room to stand up and lie down and, when confined in a pen, to turn around. The lairage shall have sufficient accommodation for the number of animals intended to be held. Drinking water must always be available to the animals, and the method of delivery must be appropriate to the type of animal held. Troughs must be designed and installed in such a way as to prevent fouling by faeces.

IV.3. *Holding pens*

Holding pens should be rectangular rather than square, to allow as many animals as possible to stand or lie down against a wall. Where feed troughs are provided, they should be placed along the walls rather than in the centre of the pens, and should be sufficient in number to allow all animals to feed undisturbed.

IV.3.1. *Tethers and individual stalls.* Where tethers, ties or individual stalls are used, these shall be designed so as not to cause injury or distress especially when the animals are lying down, standing up, drinking and feeding.

IV.4. *Passageways and races*

Passageways should either be short and straight, or slightly curved. Passageways and races must have solid sides, but when there is a double race the shared partition should allow adjacent animals to see each other. For pigs and sheep, passageways should be wide enough to enable two animals to walk side by side for as long as possible. At the point where passageways and races are reduced in width, this should be done by a means which prevents bunching of the animals. Handlers should be positioned alongside races and passageways on the inside radius of any curve, to take advantage of the natural tendency of animals to circle an intruder. Where one-way gates are used, they must be of a design which avoids bruising. Races should be horizontal but where they ascend the slope must not be greater than 10°.

IV.5. *Waiting pen*

There should be a waiting pen, with a level floor and solid sides, between the holding pens and the point of slaughter, to ensure a steady supply of animals for stunning and to avoid having handlers trying to rush animals from the holding pens. The waiting pen should preferably be circular, but, in any case, so designed that animals cannot be trapped or turn back, with either a solid moving gate for cattle and horses, or an articulated gate for pigs and sheep.

IV.6. *Construction*

Lairages must be constructed so as to provide protection from unfavourable climatic conditions, using strong and resistant materials such as concrete and metal which has been treated to prevent corrosion. Surfaces must be easy to clean and disinfect. There shall be no sharp edges or protuberances which may injure the animals.

IV.6.1. *Floors.* Floors should be well drained and not slippery; they should not cause injury to the animals' feet. Where necessary floors must be insulated or provided with appropriate bedding. Drainage grids should be placed at the sides of pens and passageways and not where animals would have to cross them.

IV.6.2. *Lighting.* Lairages must be provided with adequate lighting, but care must be taken to avoid harsh lights and shadows, which frighten the animals. The fact that animals will move more readily from a darker area into a well-lit area might be exploited by providing for lighting that can be regulated accordingly.

IV.6.3. *Ventilation.* Lairages shall be well ventilated, and the air flow should be arranged so that odours and draughts do not adversely affect the health and welfare of the animals.

IV.6.4. *Noise.* Care should be taken to protect the animals from excessive noise, for example by avoiding the use of noisy hydraulic or pneumatic equipment, and muffling noisy metal equipment by the use of suitable padding, or by minimising the transmission of such noise to the areas where animals are held and slaughtered.

IV.7. *Outdoor lairages*

Outdoor lairages must be secure and well fenced; water must be provided. Where animals are kept in outdoor lairages without natural shelter or shade, they must be protected from the effects of adverse weather in particular from the combined effects of low temperatures, wind and rain (wind chill factors) by means of a solid wall of sufficient height. A dry lying area should also be provided.

V. Care

V.1. *Guidelines*

Animals in lairages shall be cared for in accordance with the following guidelines:

V.1.1. *Group penning.* As far as possible established groups of animals should be kept together. Each animal must have at least enough space to stand up, lie down and turn around. Animals hostile to each other shall be separated.

V.1.2. *Tethers and individual stalls.* Where tethers, ties or individual stalls are used they must allow animals to stand up and lie down without causing injury or distress.

V.1.3. *Floors.* All animals shall have access to a solid and dry lying area and when they are kept overnight they should have suitable bedding material.

V.1.4. *Security.* Animals should be kept securely in the lairage and care shall be taken to prevent them from escaping.

V.1.5. *Water.* Drinking water must be provided to the animals on their arrival at the slaughterhouse unless they are slaughtered without delay. In addition, drinking water must be available at all times to animals in lairages.

V.1.6. *Sprinkling.* If animals have been subjected to high temperatures, they should if possible be cooled by the use of water sprinklers. This is particularly recommended for pigs, but shall not be used for poultry.

V.1.7. *Feed.* If animals are not to be slaughtered within twelve hours of arrival they shall be given sufficient quantities of feed on arrival and at intervals appropriate to their species. Where it can be reasonably assumed that animals have not been fed for twelve hours or more and they are not likely to be slaughtered within two hours, they should be given sufficient quantities of suitable feed on arrival.

V.1.8. *Milking.* Dairy animals in full lactation must be milked at least every twelve hours; other lactating dairy animals must be milked when necessary.

V.1.9. *Lighting.* The lairage area should be well lit in order to enable the animals to see clearly without being dazzled. During the night, the lights should be dimmed.

V.1.10. *Inspection.* The condition and state of health of the animals in a lairage shall be inspected at least every morning and evening by a veterinarian, or, under the latter's responsibility, by another competent person. Sick, weak, injured or unweaned animals shall be slaughtered immediately. If this is not possible, they shall be separated and placed in appropriate, bedded accommodation in order to be slaughtered as soon as possible.

V.1.11. *State of the lairage.* The lairage and the equipment contained in it must be kept clean and in good repair.

V.1.12. *Outdoor lairages.* Where animals are kept in outdoor lairages, care shall be taken to ensure that they are not subjected to physical, chemical or other health hazards.

V.1.13. *Quiet.* Animals shall be left undisturbed as far as possible and noise shall be kept to a minimum.

VI. **Slaughter**

Slaughter-rooms and equipment should be designed and constructed in such a way as to allow slaughtering to take place as calmly and efficiently as possible.

Equipment necessary for the slaughter of animals shall be well maintained. Suitable spare equipment shall be kept at the place of slaughter for emergency use.

Operatives shall be sufficiently skilled to avoid unnecessary excitation, stress or suffering of the animals during restraint, stunning and bleeding.

VI.1. *Restraint*

VI.1.1. *Methods.* In order to apply stunning equipment to the parts of the body indicated hereafter without causing unnecessary excitement or distress animals must be restrained in some way. The means of restraining shall be such that they do not cause unnecessary suffering or distress.

Pending the development of other satisfactory methods, the following methods have been found to be effective for this purpose depending on the species concerned:

— head collars, halters or bridles;

— stunning pens in which the animals can stand;

— mechanical conveyors;

— manual restraining of small animals;

— shackles and cones for poultry.

In the case of solipeds and cattle suitable means should be used to position the head of the animal for stunning.

VI.1.2. *Prohibitions.* No means of restraint causing avoidable suffering shall be used. The following practices in particular are prohibited:

— tying the animals' hind legs;

— suspending an animal before it will be stunned, except poultry if stunned afterwards without undue delay;

— using stunning equipment as a means of restraining or moving animals.

VI.1.3. *Equipment.* The slaughterhouse management shall be informed if adequate restraint is not possible and shall take any necessary action to remedy matters.

VI.2. *Stunning*

Any stunning method shall aim at bringing the animal as quickly as possible into a state of insensibility which lasts until it is dead.

Scientific studies indicate that the best way to ensure that an animal does not recover from this state of insensibility is to apply stunning methods which cause also cardiac arrest.

The effectiveness of the method used shall be the responsibility of the management of the slaughterhouse and shall be checked regularly by a veterinarian.

In the light of scientific knowledge and practical experience, the following procedures may be applied:

VI.2.1. *Stunning or killing of animals by mechanical instruments.* Stunning by the use of mechanically operated instruments shall aim at bringing the animal instantaneously into a state of insensibility which lasts until it is dead.

The following guidelines should be applied:

VI.2.1.1. *Methods.* Pending the development of other satisfactory methods, the following methods have been found to be effective, and are recommended:

— mechanically-operated instruments whose projectile penetrates the brain (captive bolt, free bullet). This method is satisfactory for domestic solipeds, cattle, sheep and goats, pigs and rabbits;

— mechanically-operated instruments which administer a blow to the brain (percussion stunner). This method is satisfactory for cattle of over six months and for rabbits. Special care should be taken in selecting a percussion stunner which is appropriate to the size and species of the animal.

VI.2.1.2. *Personnel.* Persons carrying out slaughter must ensure:

— that the animal is adequately restrained;

— that the equipment used is maintained and operated properly and in accordance with the manufacturer's recommendations in particular with regard to the strength of the instrument or of the cartridge, in relation to the species and size of the animal;

— that the instrument is applied at the point indicated in the diagrams.

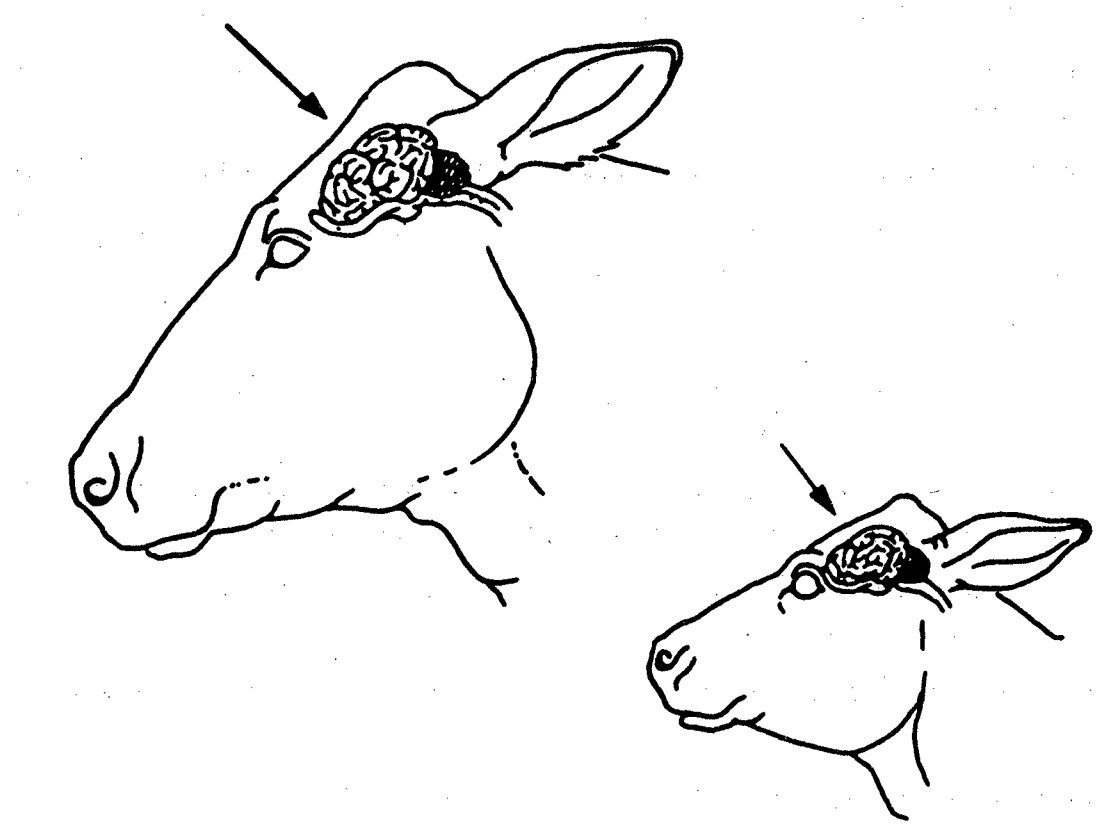
In addition, such persons must be able to recognise when an animal is not correctly stunned and must take appropriate action.

VI.2.1.3. *Timing.* The slaughterhouse management shall ensure that no animal is stunned unless bleeding can take place without delay.

No animal should be brought into the slaughter-room until the operator is ready to stun it.

VI.2.1.4. *Positioning.* Mechanical stunning instruments should be applied to the areas indicated in the diagrams.

Cattle

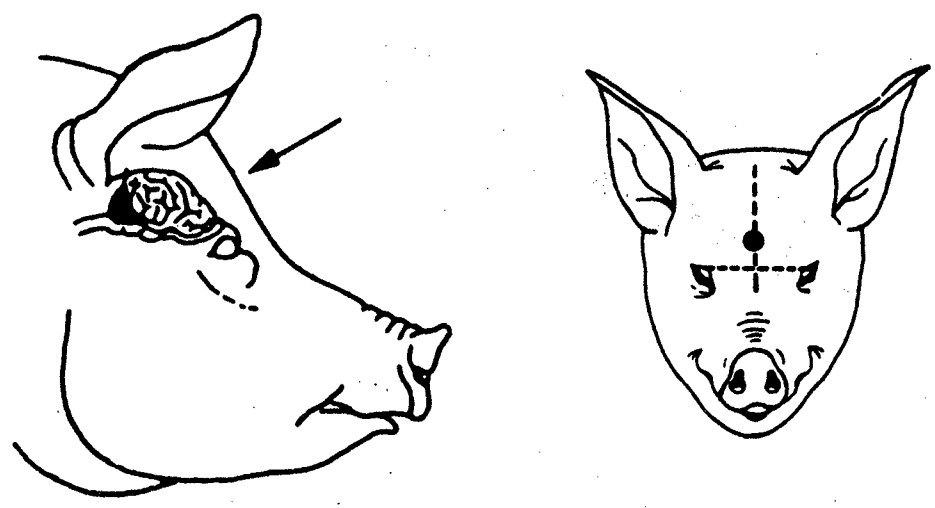


Cattle (other than bulls and calves) : aim at the point halfway between the top of the head and the imaginary line between the eyes and place the muzzle at right angles to the frontal surface.

Bulls : aim at the point halfway between the top of the head and the line between the eyes and place the muzzle very firmly 1 cm to the side of the ridge which runs down the centre of the face, and at right angles to the frontal surface.

Calves : aim slightly lower than for cattle, as the upper part of the calf's brain is often under-developed, and place the muzzle at right angles to the frontal surface.

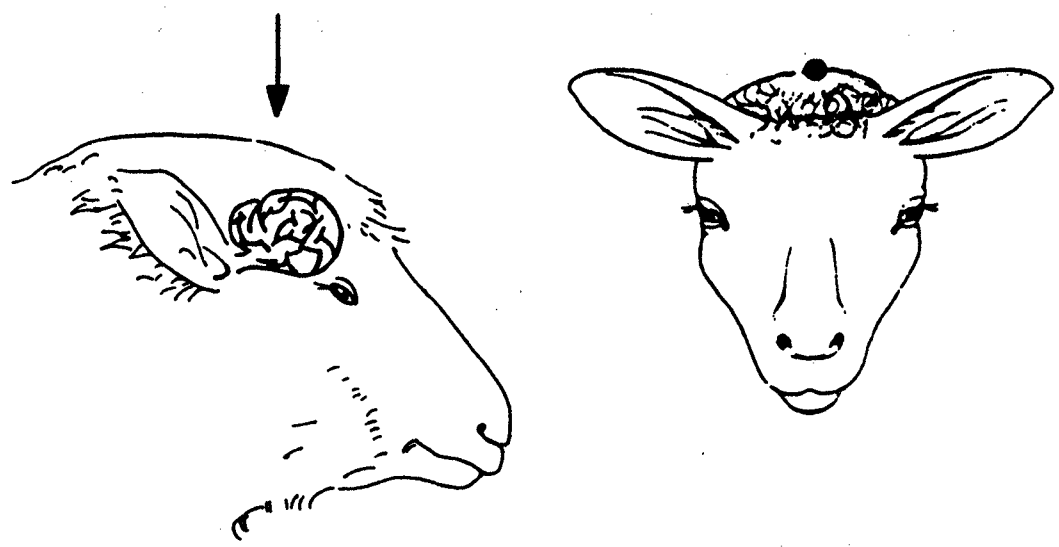
Pigs



Pigs (other than boars): place the muzzle about 2,5 cm above the level of the eyes, and at right angles to the frontal surface.

Boars: place the muzzle about 5 cm above the level of the eyes to one side of the ridge which is in the mid-line of the skull, and at right angles to the frontal surface.

Sheep



Hornless sheep: use the highest point of the head and aim towards the angle of the jaw.

Horned sheep: place the muzzle just behind the ridge which runs between the horns and aim towards the mouth.

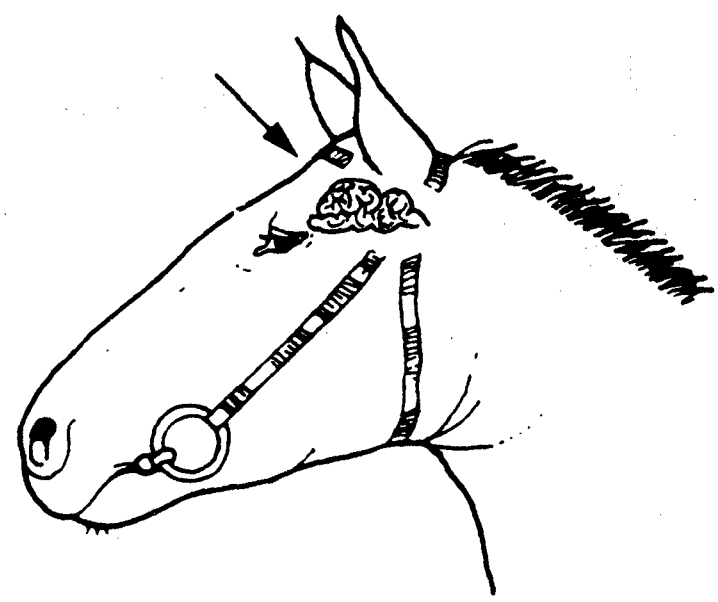
Goats

Hornless goats: use the highest point of the head and aim towards the angle of the jaw.

Horned goats: place the muzzle just behind the ridge which runs between the horns and aim towards the mouth.

Kids: as for calves

Horses



Place the muzzle at right angles to the frontal surface well above the point where imaginary lines from eye to ear cross, as the brain is in the upper part of the head.

Rabbits

The same stunning position should be used as for hornless sheep.

VI.2.1.5. *Signs of correct stunning using a mechanical instrument:*

1. The animal collapses immediately and does not attempt to stand up.

2. The body and muscles of the animal become tonic (rigid) immediately after the shot.

3. Normal rhythmic breathing stops.

4. The eyeball faces straight ahead and is not rotated.

VI.2.2. *Electrical stunning.* Stunning by electricity shall aim at bringing the animal instantaneously into a state of insensibility which lasts until it is dead.

The following guidelines should be applied :

VI.2.2.1. *Personnel.* Persons carrying out electrical stunning must ensure:

— that the animal is adequately restrained, preferably with its legs off the ground;

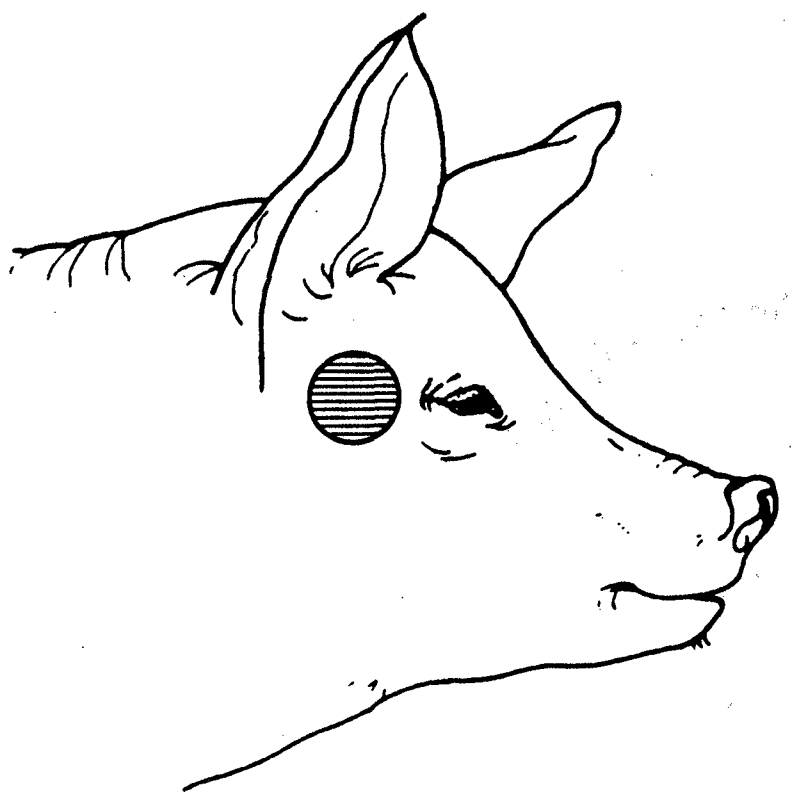
— that the equipment used is maintained and operated properly and in accordance with the manufacturers' guidelines.

The veterinarian should ensure that staff are able to recognise when an animal has been correctly stunned, and when not.

VI.2.2.2. *Electrodes.* Electrodes shall be designed, maintained and cleaned regularly to ensure that the flow of current is optimal. They shall be placed so that they span the brain, the location of which is indicated on the diagrams hereafter.

If in addition it is intended to cause cardiac arrest, the electrodes must either span the brain and immediately thereafter the heart, on the condition that it has been ascertained that the animal is adequately stunned, or span brain and heart simultaneously.

Pigs



Sheep

VI.2.2.3. *Use.* Electrical stunning equipment shall never be used as a means of guidance, restraint or immobilisation, and shall not deliver any shock to the animal before the actual stunning or killing.

VI.2.2.4. *Apparatus.* The apparatus and in particular automatic equipment must be maintained in a clean condition even during regular use and should be checked regularly with adequate technical means, under the responsibility of a veterinarian, to ensure that it is in proper working order.

The apparatus should:

— incorporate a device which measures the impedance of the load and prevents operation of the apparatus if the minimum required current cannot be passed;

— incorporate an audible or easily visible indicator showing the length of time of its application to animal;

— be connected to a device indicating the voltage and the current under load, positioned so as to be visible to the operator.

Continuous recording methods are recommended to allow checking of the current delivery.

VI.2.2.5. *Contact.* Appropriate measures, such as removing excess wool or wetting the skin only at the point of contact shall be taken to minimise impedance of the skin.

VI.2.2.6. *Duration.* In the present state of research, if electrical stunning is used it must be applied together with cardiac arrest for cattle.

For pigs, sheep and goats, poultry and rabbits research in some countries has indicated that electric stunning combined with cardiac arrest is an adequate method from the point of view of animal welfare.

In other countries electric stunning, the effect of which lasts until death from exsanguination follows, is found satisfactory.

VI.2.2.7. *Current.* In the light of present scientific knowledge and the existing stunning apparatus it is recommended that for electrical stunning the following minimum current levels should be used when employing a 50 hertz sinusoidal alternating current:

Species	Minimum current levels
Cattle	2,5 amps (with cardiac arrest)
Calves	1,0 amps (with cardiac arrest)
Pigs	1,25 amps
Sheep and goats	1,0 amps
Rabbits	0,3 amps

VI.2.2.8. *Timing.* In all cases the correct current level shall be attained within one second and maintained for at least between one and three seconds and in accordance with the manufacturer's instructions.

VI.2.3. *Electrical stunning of birds using a waterbath*

The following guidelines should be applied:

VI.2.3.1. *Restraint.* In the case of birds suspended on a moving line, measures shall be taken to ensure that the birds arrive at the stunning point in a sufficiently relaxed state to allow stunning to be carried out effectively. The birds must be secure in their shackle, but there must not be undue pressure on their shanks.

VI.2.3.2. *Design.* Waterbaths for poultry must be adequate in size and depth for the type of bird being slaughtered, and their height must be adjustable to allow for the head of each bird to be immersed.

The waterbath must 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 must incorporate an ammeter which displays the total current flowing through the birds. Measures shall be taken to prevent any shock being delivered to the birds before the actual stunning.

VI.2.3.3. *Contact.* As far as possible, the electrode which is immersed in the water shall extend the length of the waterbath. The shackle-to-leg contact should be wetted. In order to reduce resistance to electrical current it is recommended that saline water is used in the waterbath.

VI.2.3.4. *Duration.* Birds shall receive the current for at least four seconds.

VI.2.3.5. *Voltage.* Using waterbaths, birds are stunned in groups and different birds will have different impedances. The voltage must 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.

VI.2.3.6. *Currents.* When birds are stunned or killed in groups a minimum current per bird must be maintained. This current will vary with different species of birds. To ensure effective stunning of all birds in a group sufficient current should pass through the bird's brain; some studies have indicated that it is preferable to cause irreversible cardiac dysfunction.

According to certain studies, to achieve 100% unconsciousness and 90% cardiac arrest in each group of birds, the following values have been found to be satisfactory when employing a 50 hertz sinusoidal alternating current.

Species	Current (milliampères per bird)
Broilers	120
Layers (spent hens)	120
Turkeys	150
Ducks and geese	130

While lower currents may also be satisfactory, the current shall in any case be such as to ensure that unconsciousness occurs immediately and should last until the bird has been killed by cardiac arrest or by bleeding.

VI.2.3.7. *Back-up.* Every effort shall be made to ensure that no conscious birds enter the scalding tank.

In the case of automatic systems, until fail-safe systems of stunning and bleeding have been introduced, a manual back-up system is recommended to ensure that any birds which have missed the waterbath stunner and/or the automatic neck-cutter are immediately stunned and/or humanely killed.

To lessen the number of unstunned birds, 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.

VI.2.4. *Stunning of pigs by exposure to carbon dioxide (CO_2)*

If pigs are stunned by means of CO_2 the following guidelines should be followed:

VI.2.4.1. *Concentration.* The concentration of CO_2 for stunning must not be less than 70% by volume. After entering the stunning chamber the animals shall be conveyed to the point of maximum concentration of the gas and be kept until they are dead or brought into a state of insensibility which lasts until they are dead.

In any case the concentration of the gas must be such that it minimises as far as possible all stress of the animal prior to loss of consciousness.

VI.2.4.2. *Design.* The chamber in which animals are exposed to CO_2 and the equipment used for conveying them through it shall be designed, constructed and maintained in such a way as to avoid unnecessary stress or injury to the animals.

The conveyor and the chamber shall be adequately lit to allow the animals to see their surroundings and if possible, each other.

It shall be possible to inspect the CO_2 chamber whilst it is in use, and to have access to the animals in emergency cases.

When new slaughterhouses are built, or new equipment is installed in existing slaughterhouses, conveyors shall be introduced which are large enough to contain more than one fattening pig and which have a flat and non-slippery surface where the animals can stand up as long as they are not unconscious, or otherwise remain upright without their thorax being compressed.

VI.2.4.3. *Measuring.* The chamber shall be equipped to measure and register at the point of stunning the CO_2 concentration and the time of exposure, and to give a clearly visible and audible warning if the concentration of CO_2 falls below the required level.

VII. **Bleeding**

No animal shall be bled if it appears to be conscious.

VII.1. *Timing.* From the point of view of animal welfare, the bleeding of animals, which are not irreversibly stunned, must be started without delay and in any case within the following time limits:

Stunning method	Maximum delay for bleeding to be started
Captive bolt, free bullet	60 seconds
Electricity, percussion	20 seconds
CO_2	60 seconds (after leaving the chamber)

VII.2. *Incision.* All animals must be bled by incising both carotid arteries, or the vessels from which they arise. However, when the stunning method used causes cardiac arrest, the incision of all of these vessels is not necessary from the point of animal welfare, but in all cases at least one carotid artery must be incised.

VII.3. *Inspection.* It must be possible for staff to observe and inspect the animals through the bleeding period.

VII.4. *Dressing.* After incision of the blood vessels, no scalding or other dressing procedures must be performed on the animals for at least thirty seconds, and in any case until all brain-stem reflexes have ceased.