

The Protection of Animals at the Time of Killing (PATK)

Guidance for Poultry

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Richard Griffiths, British Poultry Council

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1. Preface

This booklet provides guidance on the humane treatment of poultry prior to and during slaughter or killing in slaughterhouses and on premises other than slaughterhouses (e.g. on farm) in order to safeguard or improve welfare conditions for poultry. Ultimately it is the responsibility of the Food Business Operator (FBO) to ensure the welfare of birds at its premises.

This guidance is written to assist operators in the implementation of Council Regulation (EC) No 1099/2009 on the protection of animals at the time of killing; translated into UK legislation as:

The Welfare of Animals at the Time of Killing Regulations (England) 2015

The Welfare of Animals at the Time of Killing (Scotland) Regulations 2012

The Welfare of Animals at the Time of Killing Regulations (Wales) 2014

The Welfare of Animals at the Time of Killing Regulations (Northern Ireland) 2014

Every effort has been made for this guidance to accurately reflect the legislation, but the final legal opinion on compliance rests with the Courts. Operators and staff should remain up to date with all changes in legislation and in recommended practices.

No guidance is included here regarding the disposal of day old chicks in hatcheries. For further information on this aspect of poultry welfare please refer to the Humane Slaughter Association (HSA) publication 'Code of practice for the disposal of chicks in hatcheries' (2nd edition).

This guidance makes reference to transport regulations that came into force on 5th January 2007, but it does not fully cover the statutory requirements that apply to the transport of live poultry.

Pain, suffering and distress to poultry during handling, restraining, stunning, and slaughter should be minimised. To this end it is important that those who are responsible for, or carry out, these operations are aware of the correct procedures and the consequences if they are not followed.

Everyone engaged in the operation of slaughterhouses must familiarise themselves with the regulatory provisions to ensure that they comply with the law. Copies of Acts of Parliament and Regulations may be obtained from www.legislation.gov.uk and the European Regulation from eur-lex.europa.eu Further guidance on welfare at slaughter may be sought from either Defra, the AHVLA, the Humane Slaughter Association, or an Official Veterinarian (OV) of the Food Standards Agency.

The Humane Slaughter Association has produced a number of extremely useful publications and DVDs, which can assist the practical implementation of the areas described in this guidance. A complete list can be found on the HSA website.

This guidance should be read in conjunction with the legislation.

For the purposes of this guidance 'birds' is synonymous with 'poultry'.

2. Introduction

a. General requirements

The welfare of birds in a slaughterhouse can be safeguarded by using a variety of management systems. These systems must prevent birds from being caused avoidable pain, distress, or suffering. The handling, restraining, stunning, and slaughter of poultry must comply with EU Regulation 1099/2009 and The Welfare of Animals at the time of Killing 201X (and devolved equivalents). A slaughterhouse, as defined, means any establishment used for slaughtering terrestrial animals which falls within the scope of Regulation (EC) 853/2004.

All references to the responsibilities placed on slaughterhouse operators under these Regulations apply equally to the slaughter of birds for commercial purposes in both approved (FSA audited) and non-approved (local authority audited) premises.

Procedures in slaughterhouses must be such as to ensure that birds are not caused avoidable pain, distress, or suffering at any stage of the slaughter process. Where stunning is used birds must either be immediately killed outright or instantly rendered unconscious and insensible until death occurs. Unconscious birds must remain so until death occurs through bleeding or any other means. The design, construction, and maintenance of a slaughterhouse must be such as to prevent injury and minimise distress being caused to birds that are being processed. Birds may become distressed in unfamiliar environments such as a slaughterhouse. Stressed and excited birds can become difficult to handle and may consequently injure themselves and others.

Significant welfare ramifications of poor practices may lead to downgrading of the meat. Each and every bird should be treated as an individual sentient animal. All operations must be carried out in such a way that causes the least possible stress to birds from their arrival at the slaughterhouse until their death. Birds should be treated in a calm, unhurried, and sympathetic manner and systems should be adopted to minimise handling of live birds.

The attitude of staff to welfare when handling birds can be influenced by working conditions. Slaughterhouse design and operational procedures should be considered to maximise staff comfort and reduce the physical effort required by personnel when handling live poultry. Adequate covered accommodation should be provided for birds awaiting slaughter, which is ventilated, draught-free, and dry. This will enhance the environment for both birds and staff and will result in better bird welfare, meat quality, and productivity.

b. Standard Operating Procedures

Slaughterhouse operators must draw up standard operating procedures (SOPs) spanning all elements covered in the Regulations. These SOPs will detail areas such as (but not limited to):

- a. Key parameters for each stage of the process

- b. Equipment/machinery use, settings, and maintenance requirements
- c. Required levels of training for operatives
- d. Chain of responsibility (roles and reporting), including the responsibilities of the Poultry Welfare Officer
- e. Emergency procedures

SOPs should provide plant specific details on the areas covered in this guidance. They are documents required by legislation that must be kept up to date and may be reviewed by the competent authority upon request, for example during an audit.

c. Supervision and Training

All staff involved in the lairage and handling of live poultry should be aware of, and be sympathetic to, the welfare of birds. Understanding and care are needed in the handling of birds both before and at the time of slaughter, and this must be supported by skill, efficiency, and adequate training. Operators of slaughterhouses must ensure that all killing and related operations shall only be carried out by persons with the appropriate level of competence to do so. A Certificate of Competence is required for the:

- a. handling and care of poultry
- b. restraint of poultry for the purposes of stunning or killing
- c. shackling of live poultry
- d. stunning of poultry
- e. assessment of effective stunning
- f. bleeding of poultry
- g. slaughtering of poultry subject to religious rites

The slaughterhouse operator must designate one or more persons as a Poultry Welfare Officer (PWO), holding a Certificate of Competence in all of the above areas for which he or she is responsible in the slaughterhouse, and will be responsible for assisting the operator in ensuring compliance with the Regulations and bringing any issues to the operator's attention.

In order to ensure that appropriate action is taken with regard to bird welfare, a comprehensive written animal welfare policy that reflects plant operations should be in place. The animal welfare policy document should be read and understood by all slaughterhouse personnel responsible for looking after poultry awaiting slaughter; and should be available at all times. The welfare policy should be incorporated as part of company procedures and should be reviewed and updated regularly.

The welfare policy should address the following issues:

1. General policy aim and objectives:
 - a. Why the welfare of birds is important, and how it should reflect the legal requirements set out in the Regulations
2. 'Monitoring of welfare and adequate preventative/ corrective action systems in place to ensure animal welfare is protected' including:
 - a. Bird condition on arrival at the slaughterhouse

- b. Stocking densities of vehicles and crates
- c. Unloading birds from vehicles
- d. Lairaging
- e. Movement and handling of birds up to the point of stun
- f. Shackling of live birds
- g. Stunning and permitted stunning methods
- h. Checking of effective stun
- i. Permitted slaughter methods
- j. Bleeding through to scalding
- k. Emergency killing methods, equipment, and instances of use
- l. Religious slaughter
- m. Emergency procedures
- n. A maintenance programme to ensure equipment including stunning equipment and fitments are regularly checked and maintained. to ensure animal welfare is protected.
- o. Cleaning schedule – to ensure that crates and modules and lairage areas are properly cleaned and disinfected
- p. A staff training programme, including the requirements for Certificates of Competence

The training of staff should be recognised as being a continuing process, which should be monitored and reviewed on a regular basis. It is a requirement under the Regulations that, at all times when there are live birds on the premises, a PWO is available, and who has authority to take whatever action may be necessary to safeguard the birds' welfare. Arrangements should be made for all staff involved in the handling of live birds, up to and including the point of slaughter or killing, to receive training appropriate for the job(s) that they will be doing, and to hold the relevant Certificate of Competence. Staff who undergo this training should be monitored to ensure that they are competent in meeting birds' welfare needs, and not subjecting them to avoidable pain, distress, or suffering. Staff should be kept up to date with bird welfare issues through professional development options.

d. Certificates of competence/Licensing

A bird must only be handled, restrained, stunned, slaughtered, or killed in a slaughterhouse by someone who holds the relevant Certificate of Competence [or licence if this is to cover registered establishments]. The Certificate of Competence will state:

- a. The species of the bird to which it applies
- b. The procedures the certificate holder can carry out
- c. The type of equipment that can be used for the procedure

Anyone who has not previously held a Certificate of Competence and who currently is being trained, and holds a three month temporary Certificate of Competence, can only carry out permitted operations whilst supervised by a person with a Certificate of Competence to carry out the same tasks as the trainee.

Anyone slaughtering birds by the Jewish method must also be licensed by the Rabbinical Commission.

There are certain circumstances where, under EU law a Certificate of Competence is not required:

- a. Emergency killing (detailed separately)
- b. Slaughter of a bird for the owners private consumption
- c. The killing of any animal other than for commercial purpose
- d. The killing of any bird for the purpose of disease control
- e. The killing of surplus chicks or embryos in hatchery waste in a macerator, or, in the case of chicks, by exposure to gas mixtures or by dislocation of the neck
- f. A veterinary surgeon or a person acting under the direction of a veterinary surgeon

Whatever the method of stunning, slaughter, or killing used the welfare of the bird must be safeguarded at all times. The procedure employed must not bring about avoidable pain, distress, or suffering.

e. Direct supply of small quantities of poultry

Producers who supply small quantities of poultry meat direct to the final consumer, or to local retail establishments that supply fresh meat to the final consumer, are limited in their obligations under these Regulations. They must:

- a. Spare animals any avoidable pain, distress, or suffering during killing or related operations
- b. Stun animals prior to killing, using the permitted methods
- c. Be competent to carry out killing and related operations

‘Small’ and ‘local’ are not defined in the Regulations, but until such time as they are, and for practical purposes the long accepted definitions applied under the food hygiene regime (Regulation 853/2005) should be adopted :

- a. Small - fewer than 10,000 produced per annum
- b. Local - the producer’s county and the adjoining, or 50 miles, whichever is the shortest

This does not preclude seasonal producers selling direct to the final consumer on a national basis, e.g. through internet sales.

Producers who fall under this category are not required to hold an EU Certificate of Competence for all the separate elements of slaughter listed previously. They must, however, be able to demonstrate competence to carry out the process and hold a WATOK licence.

Producers slaughtering animals for personal consumption do not require a Certificate of Competence or national licence; however they must be competent to carry out the process. It is recommended that this is achieved through the successful completion of accredited training, for example, through the Humane Slaughter Association or equivalent.

3. Transport and Unloading

a. General requirements

Unloading areas should be constructed so that birds are both protected from adverse weather conditions and are provided with adequate ventilation. Birds must be unloaded from vehicles as soon as possible after arrival and avoiding unnecessary delay.

In some cases, live bird transport vehicles with forced ventilation systems may provide more suitable environmental conditions than the lairage. Bird welfare may therefore best be maintained by them remaining on the vehicle. The protection of birds from adverse weather conditions and the provision of adequate ventilation also apply if there is a delay in unloading. In cases where there is an unavoidable delay to unloading it may be preferable to keep the vehicle moving, the movement of air helping to keep the birds cool.

Operators should minimise delays and unnecessary stress to birds during unloading from vehicles by ensuring that the unloading area is of a sufficient size to allow birds from the largest anticipated load to be handled and lairaged easily.

Slaughterhouse operators should have a lairage management system in place for booking-in loads of live birds so that the birds are dealt with in the order in which they are delivered, except where it is necessary to slaughter birds out of sequence due to welfare concerns.

A suitable management system should consider the following:

- a. Live birds should arrive at regular, expected intervals during the working day so there is no delay to unloading
- b. Birds are held in lairage for a minimum amount of time
- c. The lairage area does not become overcrowded
- d. The slaughter line is run at appropriate capacity

Drivers of poultry vehicles should maintain regular contact with the lairage supervisor so that the arrival of bird consignments is anticipated.

Crates containing birds must be unloaded from vehicles with care in a calm unhurried manner to ensure that birds are not injured in any way. The crates should be maintained in the upright position so that the birds are not in an unsettled or excitable state when they are subsequently brought to slaughter. Forklift drivers and others involved in the process should be sufficiently qualified and skilled in the handling of live birds in crates or other modular systems, to avoid excessive noise and jolting of birds held in crates. If driving a forklift is the sole job of an operative then that person will not require a Certificate of Competence, although must comply with relevant EU and national rules on transporting and handling animals in slaughterhouses.

When unloading birds in crates, staff must ensure that:

- a. Crates are handled with care and, where possible, crates are unloaded horizontally and mechanically
- b. Crates are stacked far enough apart to permit adequate airflow between stacks

- c. Particular care is taken when moving crates with a perforated or flexible base

Following unloading, all consignments of birds should be carefully inspected to assess their overall condition. This will involve looking for any signs of injury or distress, including heat and cold stress. It is important that this inspection process is undertaken properly to enable any unfit birds to be identified to prevent any further distress. This inspection should be undertaken by a person holding a relevant Certificate of Competence and recorded in line with the companies Standard Operating Procedures.

Where birds are found injured or dead, and findings indicate that this may have occurred as a result of deficiencies in catching procedures or during transport, steps must be taken by the appropriate person(s) (as detailed in the SOP) so as to avoid recurrence of similar incidents.

Under WATOK a person holding a relevant Certificate of Competence should inspect lairaged birds at least every morning and evening, especially where slaughter is delayed. Any birds that are found to be ill or injured, or unfit for any other reason, such as heat exhaustion, must be immediately either killed or stunned and bled using a permitted method. and findings indicate that this may have occurred as a result of deficiencies in catching procedures or during transport, steps must be taken by the appropriate person(s) (as detailed in the SOP) so as to avoid recurrence of similar incidents.

In summary, unloading of birds must consider the following:

- a. Birds must be unloaded from vehicles as soon as possible after arrival at the slaughterhouse
- b. Birds must be protected from adverse weather conditions and provided with adequate ventilation
- c. Birds must be unloaded with care
- d. Birds that have subjected to high temperatures and/or humidity must be cooled by appropriate means
- e. Birds must be inspected on arrival at the slaughterhouse lairage
- f. Birds that are sick or injured must be killed humanely without delay

4. Lairage

a. General requirements

Operators of slaughterhouses must provide a suitable, covered lairage where birds can temporarily be accommodated prior to slaughter. A lairage must provide birds with shelter from adverse weather conditions. This means that crates containing birds must not be left in direct sunlight and must be sheltered from wind and rain.

Birds should be slaughtered as soon as possible after their arrival at the slaughterhouse so as to minimise the amount of time birds spend in the lairage.

A member of staff holding a relevant Certificate of Competence must be appointed to be responsible for birds in the lairage area. This person should have the authority to make immediate changes to operating procedures in the slaughterhouse to ensure satisfactory welfare at all times, for example, to identify priorities for slaughter.

Operators should have an appropriate lairage management system in place to protect the welfare of the birds in lairage. The lairage management system should include good lines of communication with hauliers and farms supplying poultry to the slaughterhouse. In the event of any delay in slaughtering birds, such as caused by line breakdown or equipment failure, hauliers and farms should be notified to ensure that deliveries of birds do not result in a build-up of excessive numbers of birds in the lairage.

Personnel involved in transporting birds to the slaughterhouse and those responsible for birds in the lairage, should be aware of what action to take to prevent the build-up of excessive numbers of birds in the lairage, e.g. delay of catching birds on farm.

Once in the lairage no group of birds should wait for an extended period of time before slaughter. The only exception to this recommendation is when sick or injured birds are deemed to require emergency killing.

Lairages should be constructed so they can be thoroughly cleansed and disinfected. Walls and floors should be durable, impermeable, and easy to clean and disinfect. The lairage and the equipment in it should be kept clean and in good repair. Cleaning operations in the lairage must be carried out without splashing dirt or water onto any birds awaiting slaughter. There should be effective procedures in place for the control of vermin.

Noise levels in the lairage should be minimised. Birds can become stressed and excited when they hear noises such as that caused by machinery or other sudden, loud, or unfamiliar noises.

Lighting in all parts of the lairage should be sufficient to allow birds to be inspected at any time. If birds are to be kept in the lairage overnight, it should be possible to switch the lighting on and off, or to dim it. Reduced or blue lighting in the lairage can be used to help calm birds.

Adequate ventilation must be provided. The objective of any ventilation system is to encourage the movement of air through and around stacked crates, so that warm and moist air within the crates is withdrawn and replaced by cooler drier air, to promote the birds' thermal comfort.

Where detailed in the SOP, lairage personnel should be trained in permitted emergency killing methods in the event that a bird must be killed immediately on welfare grounds.

b. Avoidance of heat stress in birds

An increase in body temperature of only 4°C above normal body temperature (usually 39°C to 41°C) can result in the death of a bird from hyperthermia (heat stress). The death from heat stress of any birds held in lairage is unacceptable, since environmental conditions are measurable and the development of heat stress is both predictable and preventable.

To ensure that heat stress in birds is spotted at an early stage, operators should ensure the following:

- a. The inspection of crates when they arrive at the lairage to check if any birds are panting, distress or exhausted
- b. That birds found in an advanced state of distress should be killed immediately
- c. The use of relative humidity and temperature sensors throughout the lairage and within the bird crates where possible (at bird level) to monitor the environmental conditions
- d. That corrective action is put in place if temperature and humidity are increasing
- e. The minimising of the length of time birds are kept in lairage by careful management of arrival schedules
- f. That in the normal course of operations birds should remain in the lairage for a maximum time of three hours

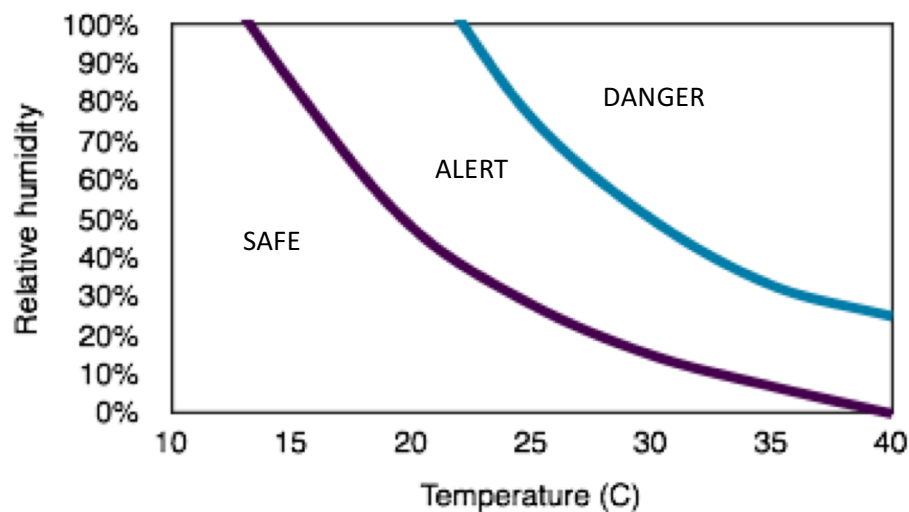
The stocking density of birds affects the temperature and humidity in the crates and flow of air through them. An average broiler produces 10 to 15 watts of heat, and water vapour is constantly lost from the bird as it breathes. The combined effect of many birds packed into one crate is to raise significantly the local temperature and relative humidity of the air within the crate. Temperature and relative humidity within the centre of each crate is likely to be significantly higher than environmental temperature and humidity immediately outside.

Heat build-up inside poultry modules is a problem throughout the year, not just in summer, and a significant temperature gradient may develop from top to bottom of a stack of crates due to rising heat. In a well-ventilated lairage a rise in temperature inside the crates containing birds occurs primarily in the first hour in which they are kept in the lairage, after which time an elevated equilibrium temperature is reached. However, conditions combining to cause birds in crates to suffer from thermal stress (humidity, fatigue) deteriorate with increasing time in lairage.

Portable or fixed humidity and temperature sensors should be used throughout the lairage and when measuring the temperature in full crates. This is to ensure that the environmental conditions maintain a satisfactory standard of bird welfare. Particular care and

consideration should also be given to end of lay hens, especially poorly feathered birds that are more susceptible to chilling.

The below diagram illustrates how the combined effects of environmental temperature and humidity interact to cause thermal stress in birds. The thermal environment should permit birds to adequately maintain an acceptable body temperature at which their welfare is not compromised - the 'SAFE' zone.



Combinations of temperature and humidity in the 'ALERT' zone represent conditions where the ability of the birds to maintain a suitable body temperature is likely to be compromised. Their body temperature is likely to start rising with the potential for development of heat stress and poor welfare. Action should be taken at this point to improve local ventilation around the birds and return local temperature and relative humidity to the 'SAFE' zone.

Combinations of temperature and humidity in the 'DANGER' zone are likely to be significantly reducing the birds' ability to maintain their normal body temperature (thermoregulate). Birds will be suffering heat stress in such conditions and there will be a risk of birds dying. Welfare will be very poor and immediate action must be taken to correct the local environmental conditions.

Continuously open ventilation in the lairage roof may be sufficient on its own to remove stale air from the lairage, however forced ventilation may be needed in some circumstances. Adjustable wall-mounted air inlets fitted above stacked crates can provide a draught-free flow of air. Natural convection of rising heat may be enhanced by placing crates containing birds near to extraction fans, where the fans are either over each stack of crates, or at the apex of the roof. Birds should not be exposed to excessive noise and draught.

Air entry points and the route of ventilated air through the lairage should be considered with view to preventing local effects and short-circuiting of airflow so that air passes over and around birds in crates. Fans should improve internal air mixing to avoid hot and cold spots and to extract stale air, rather than merely re-circulate hot and humid air. If controlled

ventilation at bird level is provided by fans, operators should aim to achieve air change at module level with minimum bird-level airflow of 0.1m/s.

Airflow should be increased with any rise in ambient temperature or humidity, but birds should not be exposed to undue levels of draught or noise. Radiated heat loss from the sides of a stack of crates can be improved by leaving gaps between crates and lanes of crates in the lairage. Fans, and other equipment, used to control or measure temperatures and humidity in the lairage should be subject to high standards of routine maintenance so that their operation can be relied upon when needed.

Whilst reducing air temperature, the use of water sprays or misting systems raise relative humidity levels and reduce birds' ability to lose heat by panting. Therefore, the use of misting systems to reduce air temperature is of questionable value due to the relationship between humidity and evaporative heat loss in birds. Birds will suffer severe heat stress if the air entering crates is above 20°C and has a high relative humidity. Misting systems should not be used to reduce lairage temperature as they are generally counterproductive and can induce heat stress in birds.

In summary the following steps should be taken to reduce the likelihood of heat stress developing in the lairage:

- a. Stocking density should be actively managed to ensure that there is adequate forward planning to prevent heat stress in hotter or humid weather. In hotter weather consider reducing the stocking density of birds in the crates when loaded on farm.
- b. Stack crates far enough apart to encourage heat loss and air movement
- c. Install extractor fans that extract humid air and excessive heat from the crates, preferably moving the air horizontally rather than vertically
- d. Monitor the effectiveness and operation of fans, and increase their number if required
- e. Ensure a back-up means of maintaining adequate ventilation is available if the primary source fails
- f. Reduce moisture sources in the lairage, for example by locating crate or lorry washing facilities away from the lairage

c. Feeding and watering birds in lairage

Birds transported to the slaughterhouse in crates are required to be slaughtered as soon as possible.

If slaughter is delayed then birds should be provided with:

- a. Drinking water from appropriate facilities
- b. Food if slaughter does not take place within 12 hours of arrival

The operator of the slaughterhouse should have in place documented contingency plans that can be implemented without delay in the event of a major breakdown. In deciding the most appropriate course of action the slaughterhouse operator should consider what action will deliver the best welfare outcome for the birds. It is the responsibility of the slaughterhouse operator to carry out the required action and rectify breakdown.

If practicable, feed should be provided twice daily in such a way that all birds within the crate in lairage can access it without difficulty. Staff must make regular and frequent checks to ensure that all birds in lairage have access to clean water.

On some occasions, major breakdowns of slaughterhouse equipment have resulted in the return of birds to their farm of origin so that they can be fed and watered. This means that the birds are transported back to their farm of origin, removed from their crates, and then re-caught, and re-transported to the slaughterhouse when the problem with the equipment has been resolved.

In such cases the FBO should consider whether or not it is necessary to provide feed and water to lairaged birds and discuss the way forward with the OV in the slaughterhouse. This advice will be based on an assessment of the nature of the breakdown, the likely time it will take for the matter to be resolved, the lairage conditions, and the welfare of the birds.

The slaughterhouse operator should also notify farmers and hauliers about the cessation in slaughtering activity, to ensure that no further birds are despatched to the slaughterhouse until the problem has been resolved.

The birds must be inspected frequently while in the lairage. Any bird that is found to be sick or injured must be killed immediately using a permitted method.

5. Shackling of live birds, Stunning, and Slaughter

a. General requirements (for pre-stun shackling)

Teams placing birds into shackles must each hold the relevant Certificate of Competence and be thoroughly trained to handle birds in such a way as to avoid injuring birds at the point of shackling. Shackle lines should be designed so as to protect bird welfare.

The working environment in which the hang-on teams operate is important. The welfare of personnel, both in terms of environment (dust, heat, and noise) and work rate (throughput, weight lifted, and distance moved), must receive due consideration so as to minimise operator stress and protect the welfare of birds.

Birds should be presented to the hang-on team in such a way that minimises the amount of handling before shackling. Birds are usually presented in crates, which may be of differing designs and sizes. Care must be exercised when birds are removed from the crates so as not to cause injuries or damage to the birds. Fractures to the bones of the leg and hip joint can be caused by rough handling, especially in older birds such as spent laying hens.

Birds should be presented at a height that is appropriate to the height of the shackle and that minimises the distance that the birds have to be lifted. Inverting birds inevitably causes them stress, so staff at the hang-on point must handle each bird with due consideration to its welfare.

In general, good shackle line design will include the following:

- a. A breast comforter extending below the level of the bird's head, with which contact is maintained by every bird's breast along the entire length of the line, from the point of shackling to the point of stunning, even when the shackle line negotiates an external bend
- b. A line speed that allows shackled birds time (ideally 12 seconds for chickens and 25 seconds for turkeys) to become settled in the hanging position before entering the waterbath stunner
- c. A line speed that can be adjusted according to the number of personnel present at the shackle line so that the birds can be placed with care and without undue haste
- d. A route avoiding areas where personnel are moving about, but with ready access to shackled birds in case of an emergency
- e. A route without dips, sharp turns, or rapid changes of direction
- f. A route with no obstructions to suspended birds
- g. A design to avoid pre-stun shocks
- h. A well designed and electrically insulated entry ramp to the waterbath stunner, which will assist in effective head submersion
- i. A guide rail after the waterbath, leading to the neck cutter, to position the bird's neck to ensure an effective cut
- j. A reduction in noise level and light intensity from the point of shackling to the stunner

Birds should be hung-on by both legs. The rigid shackle should be the correct size to accommodate the shank of the leg of the species of bird being processed. The fit of the

shank of the leg must be secure enough to make sure there is a good electrical contact when the bird enters the waterbath stunner. The fit must not be over-tight, as this may lead to unnecessary pain, distress, and suffering, prohibited under the Regulations. 16

Damaged, distorted, or broken shackles should be removed immediately and replaced. Spraying the shackle and leg of the bird with water will help reduce the resistance to the flow of current, helping to ensure the bird receives an adequate electric current to stun it effectively.

It is inappropriate to shackle some birds, for example, runts, birds with damaged legs, etc. These birds must not be shackled, but should be killed immediately using a permitted method.

b. Shackle hanging times

The maximum length of time between a bird being shackled and being stunned *must not* exceed two minutes for turkeys, ducks, and geese, or one minute for any other species of poultry. In the event of a line breakdown that could result in birds being shackled for more than the permitted times, birds must either be removed from the line, or killed on the line using a permitted emergency method. A reduction in the length of time between hang-on of the last bird and the entry into the waterbath stunner (ideally 12 seconds for chickens, and 25 seconds for turkeys) will reduce the number of birds that need to be dealt with in the event of a breakdown.

In summary, shackling should include:

- a. A shackle design that ensures bird welfare, good electrical contact, and does not cause unnecessary suffering
- b. A secure fit of birds into shackles
- c. A minimum of noise and disturbance
- d. A means of dealing with birds unfit to be shackled
- e. A maximum time of shackling of not more than two minutes for turkeys, ducks, and geese, and one minute for any other species of poultry

Note: The hanging times above are contained in 1099/2009, but do not apply until December 2019 for existing premises. Until that time transitional measures in WATOK apply: three minutes for turkeys and two minutes for all other species of poultry. New or structurally altered premises must comply with the new requirements.

c. Waterbath pre-stun shocks

Waterbath stunners should include an insulated entry ramp as required by Annex II, 5.5. Pre-stun shocks are painful; they are caused when any part of a bird receives an electric shock before it is effectively stunned. In most cases, pre-stun shocks are due to the drooping of wings or any other part of the bird such that electrified water is contacted before the bird's head enters the bath.

The pain caused by pre-stun shock may result in the bird reacting and flapping so violently that it lifts its head out of the path of the waterbath stunner. A bird not receiving an effective stun in this manner must be avoided.

The cause of pre-stun shocks must be investigated and corrective action taken immediately.

This may include:

- a. Modifying the design and improving the insulation of the entry ramp to assist in effective head submersion
- b. Incorporating a horizontal shackle line combined with the entry ramp to form an extension of a breast comforter, which holds the birds back for long enough so that the head 'flicks' into the electrified water in one swift movement
- c. Increasing the depth of immersion (by raising the height of the waterbath) to ensure that the birds' head and neck are completely immersed
- d. Creating a 'dipping' line that can give very quick immersion with no pre-stun shock
- e. Proper adjustment of the height of the waterbath to ensure that birds receive an adequate stun
- f. Calming the birds to reduce wing flapping prior to stun (breast comforter, reduced hang-on time, reduced light and noise levels, minimise length of shackle lines)
- g. Eliminating overflow of electrified water through effective drainage at the waterbath exit

In summary, when using a waterbath stunner:

- a. Pre-stun shocks must be avoided
- b. Careful consideration of the design of the shackle line and entry ramp to the bath is essential
- c. Waterbath height should be adjusted to reflect the size of the bird

c. Stunning methods

Regulation 1099 defines stunning as any intentionally induced process which causes loss of consciousness and sensibility without pain. Where stunning does not kill the animal this is referred to as 'simple stunning'.

Any method of stunning must cause immediate unconsciousness and the bird must remain unconscious until its death. This is referred to in the Regulations, and from here onwards in this guidance as 'simple stunning'. The most commonly used method to achieve a simple stun in poultry is the electric waterbath.

There are also stun-to-kill methods where the process must result in the instantaneous death of the bird. Electricity or gas mixtures may be used to achieve a stun-to-kill.

d. Using electricity to stun birds

A commonly used method to stun birds is by using electrical stunning. There are two distinct ways in which electricity is used in the slaughter process.

Simple stunning (electronarcosis)

Simple stunning (known as electronarcosis) is achieved when sufficient electrical current passes through the bird's brain to disrupt normal functioning so that the bird is rendered unconscious and insensible to pain. This is achieved either by applying electrodes directly to the bird's head, or by passing an electric current through the whole of a bird's body in a waterbath stunner. A high frequency alternating current (AC) or direct current (DC) is usually employed to achieve this. Simple stunning with electricity produces a stun that is reversible, i.e. if nothing further is done to the bird after the stun it will regain consciousness, usually within less than one minute.

Stun-to-kill (electrocution)

Stun-to-kill (known as electrocution) is stunning that causes instantaneous death due to cardiac arrest (stopping the heart) and occurs when low frequency (50Hz) alternating current (AC) is passed through the whole of the bird's body, affecting both the brain and the heart. Stun-to-kill delivers better welfare because the process kills each bird outright and there is no possible return to consciousness. However, some operators choose not to use stun-to-kill systems due to the level of damage (such as blood spots and bone fractures) that can be caused to the carcase, resulting in a decrease of meat quality.

Electrical stunning is commonly defined in terms of the voltage used, but although voltage is important, it is actually the amount of electric current - measured in amps (A) or milliamps (mA) - passing through the brain that is most important. The relationship between the voltage applied, the current delivered, and the bird's electrical resistance (the properties that limit the current flow) is given by the formula:

$$\text{Current (I)} = \text{Voltage (V)} / \text{Resistance (R)}$$

This means that in a fixed voltage system, the current flowing through each bird depends upon overall voltage and resistance.

e. Waterbath stunning

To ensure that an effective stun is achieved in a waterbath stunner it is essential that:

- a. The correct current is applied for sufficient time to ensure that an adequate period of unconsciousness results
- b. The electrodes are positioned and operating correctly (one electrode running the entire length of the bottom of the waterbath, and the other the earthing bar that is in contact with the shackle in which the bird is held)
- c. The contact between the bird, shackle, and earthing bar is secure
- d. The water level is sufficient to completely cover the head and neck of the suspended bird
- e. The combination of chosen waveform, frequency, and magnitude of the current are able to effect an adequate stun in every bird in the waterbath

A member of staff holding the relevant Certificate of Competence should ensure that:

- a. The electrical stunning equipment (including any control panel) is checked every day before use

- b. Any defects in the stunning equipment are rectified immediately
- c. The voltmeter and ammeter displays are regularly calibrated and read

If there is any suspicion or evidence that the waterbath stunner is failing to produce either an effective stun (simple stun or stun-to-kill) in birds, the slaughter line must be stopped and the problem investigated and rectified. Spare equipment, in proper working order, should be kept available as back-up in case the equipment in routine use fails to stun birds effectively.

The total current each bird receives in a waterbath depends on the total number of birds in the waterbath and the electrical resistance of each suspended bird. The resistance of individual birds is highly variable, and depends on factors such as age, size, and species of bird; whether the bird's plumage is wet, and whether the shanks of the leg are thickened. The most important factor is the wide variation that can occur between the bird and the shackle.

Sufficient voltage must be applied across the system to ensure that, even allowing for differences in the total resistance of individual suspended birds, each bird receives the minimum current necessary to stun it effectively.

There are monitors available (such as produced by AGL Consultancy Ltd) that can be used when setting up or testing a waterbath stunner. These devices utilise a fixed resistance equivalent to the resistance of an average bird. The device is hung on to a shackle line and passes through the waterbath stunner along with the birds. The average current flowing through the fixed resistance is recorded while the birds are being stunned. The stunning monitor indicates whether it is likely that birds passing through the waterbath are receiving adequate current to ensure an effective stun.

f. Waterbath stunning: minimum settings

Many waterbath stunners operate at constant voltage and deliver a variable current to the birds depending on their electrical resistance. It is possible to alter the frequency of the applied voltage, and the shape of the current waveform or wavelength. Waterbath stunners use either a low frequency AC source (in the range of 50Hz to 100Hz) to stun-to-kill birds, or a high frequency AC or pulsed DC source (up to 1500Hz) to simple stun birds.

With both low and high frequency stunning, times required to achieve an effective stun will vary depending on the species and electrical frequency used. However, the Regulations stipulate a minimum duration of exposure of four seconds.

The requirements in the Regulations for minimum currents are:

Frequency (hz)	Chickens (mA)	Turkeys (mA)	Ducks & Geese (mA)
<200	100	250	130
200 to 400	150	400	Not permitted
400 to 1500	200	400	Not permitted

As well as providing an immediate, effective stun, use of a source of low frequency current will also result in the majority of birds experiencing cardiac arrest (stopping the heart). For example, research has shown that a waterbath stunner using a 50Hz AC supply and providing a current of 148mA per bird will result in a stun-to-kill ratio of 99% of birds, with only 1% of birds leaving the waterbath stunned but still alive.

In the case of high frequency electrical stunning, birds should receive a stun of at least eight seconds duration to be rendered unconscious. In general, when electrical frequencies greater than 100Hz are used in the waterbath, cardiac arrests are not induced in birds so the majority of birds exit the waterbath stunned but still alive. It is therefore essential that birds are bled immediately, before they can regain consciousness.

g. Recognising an effective stun

Birds leaving the waterbath stunner must be checked to ensure they have been effectively stunned or killed. If a stun is effective, and the bird is unconscious post-stun, it will show the following signs:

- a. No rhythmic breathing for 10 to 20 seconds after leaving the waterbath
- b. Neck arched with head directed vertically
- c. Dilated pupils
- d. No reaction to comb pinch
- e. Wings held close to the body
- f. Rigidly extended legs (not an appropriate indicator when a bird is held in a shackle)
- g. Constant body tremors (movement)
- h. If a stun is ineffective, the bird may show the following signs:
 - i. Return of rhythmic breathing
 - j. A corneal or 3rd eyelid response
 - k. Tension in the neck muscles
 - l. Other voluntary muscle movements
 - m. Vocalisation

If the bird has received an effective stun-to-kill, and it is dead, the following signs will be seen:

- a. Fixed, central, dilated pupil
- b. No rhythmic breathing
- c. No response to any stimuli, e.g. no corneal or 3rd eyelid response or reaction to comb pinch
- d. Limp carcass

It is best to observe signs of rhythmic breathing by looking for rhythmic movements around the vent. This can more easily be assessed by following a single bird as it travels along the line rather than focusing on birds passing by a single point on the line. Any bird that exits the waterbath not having received an effective simple stun or stun-to-kill must be killed immediately using a permitted method. Staff must be trained to recognise the signs of an effective simple stun and stun-to-kill so as to ensure that birds have been effectively stunned or are dead.

h. Head-only electrical stunning

In small scale slaughter premises and for seasonal on-farm slaughter, birds are frequently stunned before bleeding using head-only electrical stunners. The handset has interchangeable or adjustable electrodes to accommodate different sized birds and is operated manually.

The electrodes must be placed on each side of the bird's head, spanning the brain. When switched on electrical current flows between the electrodes and through the brain causing immediate unconsciousness.

The level of current must be sufficient to cause an effective stun. The signs of an effective stun are the same as those described above.

For head-only stunning, the following requirements should be met:

- a. Minimum levels of current
- b. Small birds (e.g. domestic fowl): 240mA
- c. Large birds (e.g. turkeys or geese): 400mA
- d. The electrodes must be placed correctly, spanning the brain and not across the neck (which may cause painful paralysis)
- e. A good contact should be achieved between the electrodes and the bird's head
- f. The electrodes must be clean to ensure minimum contact resistance

Once the electrodes are in position, the appropriate current should be applied for a minimum of seven seconds and at least until the initial wing-flapping has stopped. Legs extending is also a sign that the bird has been stunned for a long enough period of time.

Should the equipment fail to produce an effective stun, repeat the method immediately, ensuring the electrodes are clean and are being applied for the correct period of time. If the equipment appears to be at fault, kill the bird immediately using a back-up method and cease any further stunning until the equipment is repaired or replaced. Equipment should be regularly checked and calibrated to ensure it is delivering the correct current.

i. Controlled Atmosphere Stun (CAS)

Birds may be killed (stun-to-kill) by exposure to one of several gas mixtures. Birds must remain within the controlled atmosphere for at least two minutes until they are dead. Permitted mixtures are listed here and detailed in the Regulations:

- a. Carbon dioxide in two phases
- b. Carbon dioxide associated with inert gases
- c. Inert gases
- d. Carbon dioxide at high concentration

There are a number of welfare advantages to using a controlled atmosphere stun (CAS) system:

- a. Shackling and inversion of live birds is avoided
- b. There is no need for live birds to be handled at any time in the slaughterhouse

- c. There are no pre-stun shocks
- d. All the birds are dead prior to bleeding

The advantages in terms of bird welfare resulting from the use of a CAS system also contribute meat quality advantages:

- a. Fewer broken bones
- b. Less damage in the breast meat
- c. Further processing of the bird can be progressed more quickly (maturation times for birds killed using mixtures with high nitrogen concentrations can be reduced by up to 75%)

The CAS chamber used must have a means of visually monitoring, e.g. windows, cameras, the birds when they are inside. Where used, windows should be positioned in the unit so that birds can be monitored upon their entry into the chamber, rather than the exit.

Any window must permit observation of the birds, in order that any problems related to the welfare of the birds can be identified quickly, and action taken immediately to rectify them. The CAS chamber must contain a device that will give audible and visible warnings if the concentration of gas in the chamber moves outside of the permitted levels.

Action to rectify the gas concentration must be taken immediately. If gas concentrations cannot be corrected in a timely manner, or if the operation of the chamber is disrupted for any reason, e.g. failure of the mechanical conveyor system, birds that are alive should be removed from the chamber and killed immediately using a permitted method.

An effective kill can be recognised on leaving the CAS unit:

- a. There will be no corneal or 3rd eyelid reflex
- b. The pupils will be fixed, dilated, and central
- c. There will be no rhythmic breathing, evident by lack of movement around the vent
- d. The carcass will be completely limp

In summary, the use of CAS must consider the following factors:

- a. The main welfare advantage of CAS is that it involves no handling, shackling, or inversion of live birds
- b. CAS is only permitted for all poultry, although high concentration CO₂
- c. Poultry should not be subjected to any of the gas mixtures prior to entry into the system
- d. On exiting the system, all birds must be checked to ensure that they are dead
- e. Any birds found to be conscious on exiting the system must be removed and humanely killed immediately
- f. In case of failure, there must be a back-up slaughter method available and ready for use at all times, which is capable of dealing with all birds awaiting slaughter (including birds in 1st phase of a bi-phasic system?)
- g. A SOP must include details of what action would be taken if a breakdown occurred while birds were in the system

Note: carbon monoxide (pure source) is not permitted for use on-farm.

j. Checking for effective stunning (simple stun and stun-to-kill)

A PWO is responsible for bird welfare in the slaughterhouse and should carry out appropriate checks at frequent intervals to ensure that SOPs are being followed. These checks are to make sure that birds are being stunned effectively, and that they are unconscious or dead after exiting the stunner. Corrective action should be taken immediately if any problems are found and the birds are not receiving an effective stun.

k. Bleeding

After stunning, the bleeding of the birds is the final stage of the slaughter process. Bleeding, also referred to as neck-cutting, may be undertaken either manually with a sharp knife or by use of an automated rotating neck-cutter. The cut should sever both of the carotid arteries and jugular veins, or the vessels from which they arise.

It is a requirement of the Regulations that bleeding must be undertaken without delay where stunning does not result in instantaneous death (simple stun or stun-to-kill). This may be achieved by, for example, minimising the distance between the point of stun and the point of neck-cut on a shackle line.

Where a slaughterhouse uses an automated neck-cutting device a member of staff holding a relevant Certificate of Competence (the slaughterman) must be situated at the site of the neck-cutter to make sure it has severed effectively the carotid arteries of each bird. It is the responsibility of that member of staff to ensure the neck-cutter makes an effective cut.

If the neck-cutter fails for any reason to operate, a manual cut must be made by the slaughterman to ensure a rapid bleed-out. The automatic neck-cutter must be checked frequently throughout the day to ensure the settings are correct. The depth of the neck cut may need to be adjusted when processing birds of differing sizes, and the blade should be sharpened regularly. Carotid arteries and jugular veins are tough, fibrous structures and may not be completely severed by blades that are not properly sharpened and maintained. Severance of both carotid arteries and jugular veins produces a profuse bleeding leading to the rapid death of the bird.

After the cut, no electrical stimulation nor any further dressing procedure is permitted until bleeding has stopped, and certainly not before:

- a. 120 seconds after neck-cutting of a turkey or goose
- b. 90 seconds after neck-cutting of any other bird

Checks must be carried out to ensure that birds are dead before further processing.

6. Permitted and emergency methods for the killing of birds

a. General requirements

In addition to the methods already described in this guidance, there are a number of other permitted killing methods for poultry (detailed in the Regulations):

- a. Penetrative captive bolt followed by neck dislocation or bleeding
- b. Non-penetrative captive bolt followed by neck dislocation or bleeding
- c. Cervical dislocation (not for routine use, only permitted where there is no other alternative method)

These can be used in both large and small throughput slaughterhouses, and on-farm.

Cervical dislocation may not be used as a routine method, but only where there are no other methods available for stunning. In the slaughterhouse this method shall not be used except as a back-up method for stunning. Percussive blow to the head is not permitted for stunning either on farm or in slaughterhouse.

Smaller slaughterhouses which do not process birds on a scale that warrants the use of the stunning methods already described in this guidance may rely on those that stun or kill birds individually. In large scale slaughterhouses the stunning of birds is likely to be automated, and to deal with birds on an individual basis would not be appropriate. However, there may be instances where large slaughterhouses may have to resort to individual methods, for example, an injured bird in a lairage, or a bird exiting a stun-to-kill device still alive.

All the above permitted methods can be used for emergency killing of birds, including for disease control purposes or where a bird is found to be injured or have a disease associated with severe pain or suffering.

The Competent Authority can derogate, on a case-by-case basis, for the use of killing methods other than permitted in the Regulations for the purpose of depopulation (killing animals for public health, animal health, animal welfare or environmental reasons under the supervision of the competent authority).

b. Emergency killing on-farm

Emergency killing means the killing of animals which are injured or have a disease associated with severe pain or suffering and where there is no other practical possibility to alleviate this pain or suffering.

The Regulation requires the competent person to take all the necessary measures to kill the animal as soon as possible.

c. Emergency killing in the slaughterhouse

There are instances in the slaughterhouse where emergency killing may be carried out. Any emergency killing must only be in a situation where the bird is in a condition associated with pain and suffering and/or where there are no alternatives to provide optimum welfare.

Examples of such instances include:

- a. Injuries obtained during transport or lairage
- b. Birds already in the slaughter process where a failure or breakdown occurs

The SOP must detail the specific situations where emergency killing may take place.

d. Cervical dislocation

Cervical dislocation does not consistently concuss the brain, and therefore does not always cause immediate insensibility so should not be used as a routine method of stunning. Cervical dislocation should only be employed in the killing of birds as a non routine method (under the restrictions laid out in the Regulations), or for emergency killing. It must only be carried out by staff who are trained and competent at neck dislocation and who are confident that they can carry out the task humanely.

If cervical dislocation is to be carried out, careful consideration should be given to the size and species of the bird to be killed. Dislocation of the neck on some birds is likely to be technically and physically demanding. The limit for a single person using manual cervical dislocation is no more than seventy birds per day, and not to be undertaken on birds of more than 3kg live-weight. If using mechanical cervical dislocation methods the (daily maximum of seventy) birds must be no more than 5kg live-weight.

If a bird is stunned by cervical dislocation, check for the following signs:

- a. a gap in the vertebrae of the neck
- b. loss of the nictating membrane and corneal reflex
- c. absence of rhythmic breathing

No attempt should be made to kill a bird by crushing its neck, e.g. with pliers. Crushing the neck is neither quick nor humane and it does not have the same effect as cervical dislocation.

e. Penetrative and non-penetrative captive bolt

The use of a penetrative or non-penetrative captive bolt delivers a percussive blow to the head of a bird, causing immediate unconsciousness and death. The Regulations permit the use of pneumatic or cartridge operated percussive devices to kill birds. Percussive devices used as routine methods in a slaughterhouse must be operated by a holder of a relevant Certificate of Competence or equivalent for on-farm use.

Examples of percussive devices are those manufactured by Accles & Shelvoke. These devices are simple to use and individuals can become competent in their operation in a short space of time.

Percussive devices are generally available in two formats:

- a. A single shot device that is powered by means of a cartridge
- b. A repeating device that is powered by compressed air

For the second of these, several can be run from a single central compressor. The required air pressure to kill different species of birds is shown below.

Bolt type	Species	Required air pressure
Flat	Chicken	110psi
Convex	Chicken	120psi
	Turkey	135psi
	Turkey (poult)	60psi
	Duck	130psi
	Goose	135psi

Techniques other than cartridge and compressed air for delivering the percussive bolt (penetrative and non-penetrative) may be, or may become, available.

Percussive blow delivers significant benefits in animal welfare to birds compared with cervical dislocation. It is recommended that all emergency killing undertaken in a slaughterhouse should be performed with this device.

It is essential that any percussive blow device is adequately cleaned and maintained on a regular basis, ideally at the end of every day that it is used. Documentary evidence on maintenance should be kept and records should be available for inspection.

When operated correctly a percussive blow device will cause the immediate death of a bird. In addition to small-scale routine use (its limits are generally practical ones) it can be used in the emergency killing of poultry and for disease control purposes.

7. Further information

a. Welfare advice

This guidance is intended to supplement and inform the practices of FBOs. It is not intended to replace thorough and ongoing good practice by an FBO on a site-by-site basis. If a FBO has any doubt or questions about good welfare practice then it must consult welfare experts. For example: a site OV, Defra, FSA, Humane Slaughter Association.

b. EFSA guidance

EFSA has produced guidance on the effective stunning of poultry, and this can be found at: <http://www.efsa.europa.eu/en/efsajournal/pub/3521>

c. Guide to Good Practice

This Guide to Good Practice has been produced by the British Poultry Council, on behalf of UK poultry producers. It is open to review and change at any time. Comments or questions on the content should be directed to:

Richard Griffiths
Director | Food Policy
British Poultry Council
rgriffiths@britishpoultry.org.uk