

**Health and Safety  
Guidance Notes  
for the Meat Industry**

1 February 2014

**BMPA**

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*These Guidance Notes have been prepared by representatives of the BMPA and following organisations in consultation with the Health and Safety Executive and published on their behalf by BMPA*



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# An Introduction to Health and Safety in the Meat Industry

(Revised November 2018)

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Meeting the demands of the seemingly ever increasing legal requirements affecting the meat industry can seem an overwhelming task. However, with the help available in these guidance notes, the task is made easier and companies can reduce costs by getting to grips with health and safety.

In a typical year, the meat industry reports over 200 major injuries and 1,000+ other reportable injuries to employees. These figures take no account of the under-reporting known to exist or of the many other injuries where time off work is less than 7 days. These figures put the meat industry amongst the worst performing sectors of the food industry, which itself is one of the worst performing sectors of the manufacturing industry generally. For example, an employee in the slaughtering sector is 3 times more likely to be injured than the average person at work.

These figures need to be qualified, not only because of the under-reporting of injuries across all manufacturing industry, but also because there may be inaccuracies in recording of industrial classifications for some statistics. Nevertheless there is clearly a serious safety issue which the industry needs to address.

To help employers in the meat industry to **benchmark** their performance, not only for reportable injuries, but also for other incidents, the BMIPA website now hosts a tool that holds accident data for the industry, which should give a more accurate picture.

Apart from pain and suffering, legal consequences, and interface with enforcement authorities, the losses these accidents represent are enormous. Studies by the **Health & Safety Executive (HSE)** in the past have shown that accidents are a very major cost to organisations. Safety pays.

In addition to the need to protect workers from injuries, there are health and welfare issues that need to be considered. In the meat industry these may include musculoskeletal disorders, such as back pain and upper limb disorders, and zoonoses as well as risks from exposure to noise and to cleaning chemicals or other substances hazardous to health.

The BMIPA Health and Safety Committee brings together representatives of industry, trade associations, trade unions and others to identify the health and safety issues the meat industry faces and prepare guidance on what can be done to mitigate them. Guidance notes have been produced for over 20 years and contain a large amount of useful and practical material.

Over the years, the health and safety legal framework has changed. The emphasis has moved from specific requirements to assessment of risk and the setting of goals. While this makes the law simpler, it makes it more difficult for employers to know exactly when they have done enough to meet the law's requirements, both in practical and management terms.

For this reason, these guidance notes cover both detailed specific information on some of the basic safety and health issues in the industry and more general advice to employers on the steps they need to take to meet their obligations under the goal-setting legislation

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The guidance is designed to complement HSE guidance and to support the Recipe for Safety approach promoted by HSE over recent years with support from the trade associations and trade unions involved in the meat industry. The [Recipe for Safety](#) approach has been based on the simple idea that there is a core of issues that are the most common causes of both health and safety risks in the food industry.

Identifying significant risks and priorities is important. Specific issues such as slips, trips and falls, knife injuries and health issues such as upper limb disorders or noise have long dominated the statistics and need to be addressed. The numbers for some of these issues still stubbornly refuse to come down.

It is now recognised that active management of health and safety can successfully reduce these numbers. In essence, organisations which succeed do so by identifying hazards, risks and priorities; planning and setting performance standards; and then actively measuring performance against these standards. Of course, there are many other factors such as clear communication, understanding and access to information, and the involvement of workers and their representatives. Much of this is an explicit requirement of the Management of Health and Safety at Work Regulations.

Against this background of risk assessment, setting priorities and performance standards, new guidance notes will be prepared or reviewed to ensure that useful material exists for all significant risks. These will set out as clearly as possible what employers need to do to control these risks in practical terms. While the guidance notes set out standards agreed to be acceptable, and are used by employers and inspectors alike in assessing conditions in workplaces against legal requirements, other solutions may of course be possible - and technical progress will be made.

Making sure your company meets the standards agreed in the guidance may take some effort. However, if employers make that effort, the number of accidents in the meat industry can be significantly lowered.

Any questions you have on the guidance can be raised through your trade association, or directly with the [HSE](#).

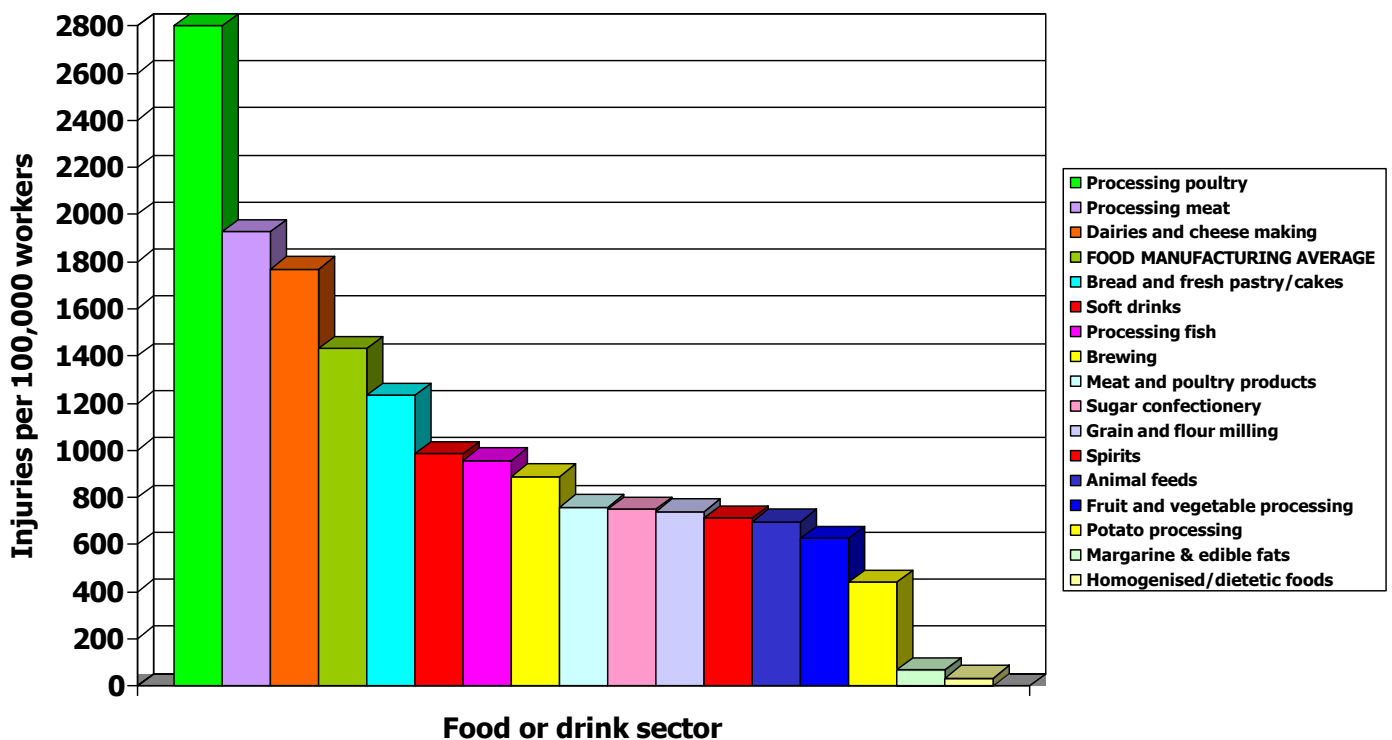
### ACCIDENTS IN THE MEAT INDUSTRY

HSE's [accident statistic tool](#) HandS-on allows visitors to their site to view, manipulate, create and export tables and data from HSE's injury & ill health data using a powerful analysis tool. This can be used effectively in relation to accidents within the meat industry. You can search a range of popular injury & ill health tables or even use the advanced search for direct access to the data

#### **Injury rate comparison between different food industries**

There are around 30 different food and drink manufacturing sectors. Injury rates vary considerably between these sectors as highlighted in the graph below that covers about half the sectors. The injury rate in each sector will vary slightly from year-to-year, although the overall trend is towards fewer injuries.

VARIATION IN INJURY RATES FOR 17 FOOD & DRINK MANUFACTURING INDUSTRIES



The graph above, based on reports to the HSE, shows how the meat industry compares with other industries. It is important to bear in mind that there may be inaccuracies in these statistics – both because of under-reporting and because of classification errors. The accident figures which are now being collected via the tool on the BMPA website may be more useful for [benchmarking purposes](#). Incidence rates are calculated according to the HSE standard, i.e. number of accidents divided by number of employees, multiplied by 100,000.

**The main causes of injuries within the meat sectors**

Although the main causes of injuries highlighted in this chapter are relevant across most food and drink industries, the following list highlights those injuries most reported in the meat sector:

- being struck by an object - mostly by hand tools including knives, especially during boning out, and suspended carcasses,
- handling and lifting - especially lifting heavy weights, carcasses, pushing/pulling trolleys and contact with sharp edges
- slips - mostly on wet or greasy floors
- machinery - such as bandsaws, derinders, skinning machines, conveyors and packaging machinery
- transport - including lift trucks, vehicles
- injury by an animal

# Training for Health and Safety in the Meat and Poultry Industry

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## INTRODUCTION

This guidance note summarises the current legally required health and safety training needs of companies and gives suggested training outlines for different grades of staff. Areas of particular relevance to the meat and poultry industry are listed at appendix 1 and the specific legal duties on training most applicable to the meat industry are listed at appendix 2.

## WHAT TRAINING IS REQUIRED?

Under the [Health and Safety at Work etc Act 1974](#) (HSW Act) and the [Management of Health and Safety at Work Regulations](#) all employees, including supervisors and managers, need to receive training to ensure competence in health and safety aspects of their job. There are specific requirements under individual pieces of legislation (see appendix 2).

Training needs at all levels are likely to be greater on recruitment. All new employees should receive basic induction training covering such things as company rules, individual responsibilities, first-aid, fire and emergency procedures. Beyond this, training needs to be tailored to the job and responsibilities of employees concerned. Supervision, practice and development of skills are also important. All health and safety training and assessment sessions are to be documented and included in the employees training records.

In small firms training may have to take the form of individual tuition. The extent of such training will vary between individuals depending upon existing competence. The training need should always be assessed. This is particularly important with young people and others new to the sector. It should never be assumed that appropriate or effective training has been given e.g. by previous employers. It is equally important to assess the outcomes of training to ensure competence. Nationally recognised Qualifications contain units on health and safety and provide for such an assessment to nationally agreed standards. The Meat Training Council is happy to advise on relevant competency qualifications and training courses, materials and organisations offering training.

Where safety representatives have been appointed by trade unions under the [1977 Safety Representative and Safety Committee Regulations](#) or elected under the [1996 Health and Safety \(Consultation with Employees\) Regulations](#), there is a duty to consult with them in good time on the arrangements for health and safety training. The views of the safety representatives will help in assessing the adequacy and effectiveness of the training provided.

### Senior Managers

Senior managers (this includes partners or directors of small firms) need to know enough about health and safety matters to determine priorities and assess the performance of people further down the management line.

They need to make sure that a responsible and professional attitude is exhibited throughout, by themselves, by departmental managers and, via supervisors, and all other employees. They should make clear that failure by employees at any level to obey safety rules will be taken as seriously as failure to obey other company rules such as those, which

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govern hygiene, production, etc. This commitment to health and safety, together with a commitment to training, should be given in the company safety policy.

#### **Managers and Supervisors**

Health and safety training for managers and supervisors is essential. They have a key responsibility for maintaining a safe working environment.

They need to be aware of hazards within their area of responsibility, company standards and the procedures for ensuring standards are maintained and used when necessary, e.g. wearing of protective gloves during knife work or emergency evacuation and rescue procedures in the event of an ammonia leak.

#### **Employees**

For employees, training is most needed to ensure competence and safe performance in their work tasks.

### **INDUCTION TRAINING FOR ALL**

#### **Company Structure**

This should be explained by a director, company secretary, or a senior manager responsible for health and safety. It should include the names of the departments and managers.

#### **Company Safety Policy**

Copies of the current policy should be provided for employees. The meaning of the document and the company's commitment to it should be explained. Particular attention is to be given to arrangements for monitoring health and safety standards and the role of supervisors and departmental managers.

#### **Safety Committee**

- Terms of reference and membership.
- Arrangements for calling meetings and actioning matters agreed
- Copies of the minutes of the last meeting should be distributed

#### **Safety Representatives**

- The role of the safety representative and agreed arrangements for joint consultation on health and safety at work.

#### **Occupational Health Arrangements**

- Including first-aid arrangements and facilities, any specific arrangements for health-related issues, services of any medical and nursing staff.

#### **Responsibilities of Individuals**

- The need to obey the company rules: disciplinary procedures.
- Reporting of accidents, near misses and work-related health problems

#### **Hazards and Standards for Safe Working**

- General overview of significant site hazards which may affect all and relevant precautions.



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### Fire and other Emergencies

- State whether there is a fire certificate; describe means of escape and the need for good housekeeping to maintain them.
- Rules on smoking; fire extinguishers, alarms and evacuation

### TRAINING OUTLINE FOR EMPLOYEES

Training should not be used to compensate for inadequacies such as poorly safeguarded machinery or badly designed workstations. All health and safety training should be recorded.

### Identifying Training Needs

- Consider risks and hazards in the workplace.
- Consider accident, ill health and incident records relevant to the job, to identify how such events have occurred and how they can be prevented.
- Information from workers about how jobs are done.
- Observation of tasks, comparison with known good practice

### Basic Instruction

- Equipment to use, how it works, what it does
- Dangers associated with use
- Proper use of equipment including safety and health precautions
- Cleaning of equipment
- Fault reporting
- What protective equipment to wear

### Final Check

To ensure effectiveness of training techniques like close supervision during introduction to work, and questionnaires designed to test understanding of safe operating procedures, should be used. Information on training and testing should be kept with employee records.

### TRAINING OUTLINE FOR SUPERVISORS AND MANAGERS

#### Responsibilities

- Explanation of supervisors' and managers' responsibilities for the health and safety of those under their role as defined in the company's safety policy and job description, encouragement of employees by personal example.
- Consultation with safety representatives, where they have been elected, and organising paid release for their training and for carrying out their functions
- Identification of training needs of workers
- Company commitment not to tolerate the breaking of safety rules.

#### Hazard identification and risk assessment

- Significant hazards and risks in their area of responsibility

#### Precautions

- The precautions necessary to avoid hazards and control risks

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### Monitoring of Health and Safety Standards

- Regular preventive inspections
- Preparation of safety check lists
- Occupational health provision
- Initiation of remedial action

### Accident Investigation

- Typical causes of accidents; relationship between near misses, minor and serious accidents.
- Reporting of accidents and identification of actions needed to prevent recurrence

### Relevant Legal Requirements

- Acts, e.g. [Health and Safety at Work etc Act 1974](#)
- Regulations, e.g. [Noise at Work Regulations 2005](#)  
[The Control of Substances Hazardous to Health Regulations 2002 \(as amended 2004\)](#)  
[Electricity at Work Regulations 1989](#)  
[Management of Health and Safety at Work Regulations](#) and other regulations implementing European Community Directives
- Approved codes of practice, e.g. COSHH, first aid at work
- Powers of Inspectors

### Sources of Information

BMPA Guidance Notes, Trade Unions e.g. USDAW, Health and Safety Executive (HSE), Agriculture, Horticulture Development Board (AHDB), Meat Training Council (MTC), National Federation of Meat and Food Traders (NFMFT) etc.

### TRAINING OUTLINE FOR SENIOR MANAGERS

- The purpose and implications of the company safety policy
- Provision of adequate resources for implementing the policy
- Consideration of health and safety implications when planning and decision-making
- Personal accountability
- The need to encourage interest in and commitment to, health and safety; safety culture
- Assessment and review of company health and safety performance.  
Use of safety audits. Role of the competent person/safety adviser.  
Role of occupational health services, causes of accidents, ill health and hearing loss.  
Costs of these losses
- Training needs of employees including those of managers with additional health and safety responsibilities
- Functions of safety representatives and safety committees
- The requirements of relevant acts, regulations and approved codes of practice, including legal duties to visitors and contractors
- Knowledge of the work of HSE and an understanding of the role and power of inspectors.
- Existence of relevant standards, e.g. BMPA Guidance and HSE publications and commitment to apply these throughout the company

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## APPENDIX 1

Health and safety areas where training is of particular relevance in the meat and poultry industry are as follows:

### 1. Slips and trips

- Correct selection of footwear and its maintenance
- Correct avoidance of spillages and cleaning up
- Correct ways of moving around to minimise risk

### 2. Prevention of cuts and stabs during use of knives and hand tools

- Correct use of knife for particular job
- Use of correct knife for particular job
- Sharpening of knife
- Misuse, bad practice, storage
- Correct use of protective equipment
- Emergency first aid

### 3. Dangerous machines

- Meat mincing machines
- Bowl choppers
- Bandsaws
- Circular knife slicers
- Machines with circular saw blades

### 4. Manual handling

- Sides and quarters of meat
- Boxed meat

### 5. Fork lift truck driving

- Selection of drivers
- Approved code of practice

### 6. Health risks

- Range
- Symptoms
- Upper limb disorders
- Frost bite
- Infections

### 7. Handling/use of corrosive and acidic materials

- General cleaning
- Cooker/smoker cleaning
- Personal protective equipment

**8. Emergency rescue/evacuation**

- Ammonia leakage
- Use of breathing apparatus
- Emergency first aid

**9. Electrical safety**

- Danger from wet environment
- Maintenance work
- Use of high voltage equipment
- Fault finding on equipment

This list is not exhaustive and employers need to consider their own needs carefully.

**APPENDIX 2**

**SPECIFIC LEGAL REQUIREMENTS FOR HEALTH AND SAFETY TRAINING**

**Management of Health and Safety at Work Regulations 1999**

Training in health and safety on recruitment, on being exposed to new risks, new work equipment, systems etc; training of the required competent person, and persons required to be competent to implement procedures for dealing with serious dangers.

**Personal Protective Equipment at Work Regulations 1992**

Training in risks PPE will avoid, use of PPE, maintenance of PPE.

**Health and Safety (Display Screen Equipment) Regulations 1992**

Training in use of workstations

**Provision and Use of Work Equipment Regulations 1998**

- Training in use of equipment
- Training of supervisors
- Training for maintenance

**Manual Handling Operations Regulations 1992**

Training on manual handling risks and prevention

**Noise at Work Regulations 2005**

Training on risk, steps to minimise risk, obtaining ear protectors, employee obligations

**Control of Substances Hazardous to Health Regulations 2002 (as amended 2004)**

Training in risks and precautions

**Electricity at Work Regulations 1989**

Training to ensure competence to prevent danger

**Health and Safety (First Aid) Regulations 1981**

Appropriate first aid training

**The Ionising Radiations Regulations 1999**

- Training in use of equipment
- Training in risk of use
- Radiation Protection Supervisor – training in ionising radiation and radiation dose

# Risk Assessment in Slaughtering and Meat Processing

(Revised January 2012)

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## INTRODUCTION

This guidance note is intended to assist in assessing risks as required by the [Management of Health and Safety at Work Regulations 1999](#). It lists common hazards related to the meat industry and identifies priority risks for attention.

## WHY DO WE NEED RISK ASSESSMENT?

Apart from being a legal requirement of the Management regulations, the purpose of a risk assessment is to identify what has to be done to make work safe. It means no more than:

- Identifying what may harm people at work. (hazards)
- Estimating the chance of harm occurring, who may be affected and how much (risk).
- Gauging whether existing precautions are adequate.
- Carrying out improvements where the existing precautions are unacceptable.

## WHAT SHOULD THE RISK ASSESSMENT COVER?

All risk needs to be considered, but trivial risks can be disregarded. Only significant risks need to be recorded.

### Hazards

Based on the accident and ill health data known to the HSE and drawing upon the collective experience of inspecting slaughterhouses and meat processing plants, a list of common hazards in the meat industry has been compiled and is attached as an appendix to this guidance. The list is not exhaustive and will need to be adapted to suit individual circumstances.

As far as is practicable assessments should cover all aspects of work and should reflect what does happen rather than what should.

The assessment must cover all groups of employees from management and should also include visitors and the public if they have access.

Trained persons, who are familiar with the operation being assessed, should carry out the assessment. The "competent person" required by the regulations should be able to assist.

### Risk

It is important to distinguish between hazard and risk. Risk means the chances of a hazard actually causing harm. For example, a head-dropping guillotine can be extremely hazardous, but carry no risk if being operated by a robot in a sealed area. On the other hand if it is being operated manually in such a position that other workers have to pass nearby it would represent an unacceptably high risk. The assessor must consider:

- a) The likelihood of an accident or ill health occurring.
- b) The seriousness of any injury or ill health caused.
- c) The number of people exposed.
- d) Special risk such as that to pregnant women or disabled persons.

### Controls

Once the assessments have been carried out it is important to ensure that they are updated as the tasks change or are modified. Health and safety law, hygiene requirements and special local conditions will all influence the final outcome. Trade associations and the local HSE will give advice.

### Action

Where risk assessments highlight shortcomings then action should be planned and initiated to remove or control the risk. A system of checks or audits should be used to ensure continuing control. There should be robust systems to ensure that new and modified tasks are assessed before being put into operation.

Employers have a legal duty to consult with staff and safety representatives when developing risk assessments and control measures. This is vital to ensure that all important risks are identified and that control measures are practicable. In addition feedback from staff and safety representatives is an effective way of continually monitoring the effectiveness of the controls.

### Prioritising Risks

The main causes of fatal accidents are well known. Transport accidents are a major cause and special attention must be given to safe systems for workplace transport. Vehicle movements, including forklift truck operations, should have special attention. Other major risks are falls from height, animal escapes (at the point of off-loading, during their movement on site and at the stunning point), and serious knife wounds. Accident and ill health records can give guidance to "hotspots" in the business.

### Common Accidents in Meat Processing

(Guidance Note GN 1 - 1 has more detailed information on accident causes)

#### Major injuries are generally caused by:

- Slips, trips and falls.
- Machinery such as derinders and bandsaws.
- Struck by objects such as knives and meat hooks.
- Falls from height.

#### Less serious injuries that result in 3 or more days off work

- Slips, trips and falls.
- Machinery (often conveyors).
- Hand and upper arm knife injuries.
- Manual handling.

### Health Risks

Ill health in the meat processing industries follows a pattern directly connected with the work activity and includes: upper limb disorders and back pain (boners and poultry workers); hearing damage from noise (carcase splitting saws, frozen meat choppers, bowl choppers and lairages); occupational dermatitis (caused often by the high hygiene standards requiring frequent washing of hands) and infections from animals and poultry.

Ultra-violet (UV) sanitising equipment is increasingly being deployed within the meat processing industry; for example exposed lamps in processing rooms which are turned on after the workforce have left; attached to conveyers, and in chillers, particularly in butchers' shops.

At high wattage, the UV light emissions help destroy bacteria. This equipment has the potential, under certain work place conditions, to emit high levels of UV light, which can be a hazard to human health.

Under the [control of artificial optical radiation at work regulations 2010](#) use of UV radiation exposure should be subjected to an [assessment of the risk of adverse health effects to the eyes or skin created by exposure to artificial optical radiation at the workplace](#).

Guidance on this important issue can be found at [guidance for employers](#).

**Please see GN1-5 Vulnerable Workers in the Meat Industry for more information and guidance on vulnerable workers.**

### Conclusion

The meat processing industry ranks quite high in terms of accidents and ill-health. Good quality risk assessments and planned control action can substantially reduce accidents and ill health, leading to a safer, more efficient workplace.

### Records and Reviews

Companies with 5 or more employees must record the significant findings of the risk assessments and make them available to the employees. There is no need for this to become an all-consuming task. Many risk assessments can cover a large number of tasks, particularly where the tasks are the same. (For example, where a production line has many people doing the same job, one risk assessment will cover them all) Equally where a task comes up very rarely it is often easier to write the risk assessment just prior to starting the task. This is particularly useful for engineering departments and saves writing hundreds of risk assessments "just in case". It is important to review risk assessments on a regular basis but the level of risk and the type of task will dictate the frequency. Long term tasks with very low risk may well only require review once every 5 years, but a high risk task with frequent changes such as a band saw operation might require review every 3 months.

## APPENDIX 1

### KNOWN HAZARDS IN THE MEAT INDUSTRY

#### Struck by Objects

- Cuts and stabbings from knives
- Goring, kicking, crushing by animals
- Collision with moving carcasses
- Captive bolt pistol

#### Slips, Trips and Falls

- Broken uneven floors
- Wet slippery floors
- Unsuitable footwear
- Smooth floors
- Slippery stairs
- Obstructions
- Stairs in poor condition, badly lit or with no handrails
- Outside yards (rain, ice)
- Uncovered drainage channels

#### Manual Handling

- Quarters of meat
- Boxes of meat, trays of meat
- Pushing/pulling bins
- Vehicle loading/unloading
- Bowl chopper knives

#### Machinery

- Hide strippers
- Flaying devices
- Dehairing machines
- Pig singeing furnaces
- Power hand tools
- Bandsaws
- Derinders
- Packaging machinery
- Bowl choppers
- Mincers
- Pie and tart machines
- Slicing machines

### Falls/Falling Objects

- Raised work platforms
- High level cleaning
- Roof repairs
- Light bulb changes
- Maintenance
- Storage racks
- Steps
- Ladders
- Fork lift truck work platforms
- Mezzanine storage areas
- Falls from vehicles
- Feed chutes in floors
- Falling carcasses
- Falling hooks
- People climbing on equipment

### Transport

- Vehicle movement in yard
- Vehicle deliveries
- Reversing
- Delivery bays
- Vehicle loading

### Mechanical Handling

- Fork lift trucks
- Offal carriers
- Conveyors (belt, screw)
- Bin lifts

### Goods lifts or hoists

- Elevators
- Passenger lifts

### Ergonomic

- Use of hand tools
- Packaging
- Poor design of work stations

### Electricity

Electric shock especially from equipment in wet environment, pressure washers, electric stunners.

### Noise

- Animals in lairage
- Pneumatic exhausts
- Stunning guns
- Machinery including bowl choppers, large mincers, large saws
- Scalding tanks (steam injection)
- Tray washers

### Hazardous Substances

- Carbon dioxide
- Nitrogen
- Biological hazards including from animals and Legionella
- Ammonia
- Corrosive cleaners
- Ultra-violet (UV)

### Fire and Explosion

- Ammonia
- Fuel storage (LPG)
- Gas fired ovens
- Welding equipment
- Bulk gas storage
- Pressure cookers
- Oxygen (controlled atmosphere packaging)
- Debris in ovens
- Flour silos
- Fryers
- Polystyrene, polyurethane cored building panels

### Temperature Extremes

- Burns from hot surfaces
- Work in cold environment (chills, freezers)
- Entrapment in chills, freezers
- Handling frozen products
- Steam
- Hot water

### References

“Recipe for Safety” on the [www.hse.gov.uk/food/recipeforsafety.htm](http://www.hse.gov.uk/food/recipeforsafety.htm)  
Five steps to risk assessment



## Control of Substances Hazardous to Health Regulations 2002 (as amended 2004) (COSHH) (Revised January 2012)

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Regulations to control substances hazardous to health were first introduced in October 1989. Since then the regulations have been updated and new advice on compliance has been developed by the Health and Safety Executive. This guidance note explains the main principles involved in the COSHH and gives advice on further sources of information.

### WHAT DOES COSHH COVER?

COSHH applies to most substances in the workplace which are known to be toxic, harmful or irritant. The exceptions are asbestos and lead which have their own separate regulations. COSHH does not apply to radioactivity or to fire and explosion hazards.

The range includes:

- chemicals or substances that are used in the workplace such as cleaning chemicals or spices and seasoning products
- dust or fumes that are produced as by-products such as cooking fumes
- biological hazards such as bacteria, viruses or fungal infections.

### HOW CAN HAZARDOUS SUBSTANCES AFFECT WORKERS?

There are three main routes of exposure

**Inhalation:** Dust, fumes or aerosols in the air can easily be breathed in. This can cause damage to the nose, upper respiratory tract and lungs. It is also the most efficient way of absorbing chemicals into the blood stream.

**Skin Contact:** Hazardous substances that come into contact with the skin can damage the skin itself causing burns or dermatitis. Some substances can trigger an allergic reaction. Others can be absorbed through the skin to affect other organs in the body.

**Ingestion:** Finally people can swallow hazardous substances. In a workplace setting this is usually less of a risk than inhalation or skin contact. However, it can happen. For example, poor hygiene practices could mean that workers hands are contaminated when they take a meal break.

### Generally the effects on health include:

**Acute Effects:** Immediate effects such as irritation, burns, shortness of breath are called acute effects. They are often easy to spot and the need to control the chemical that causes them may be fairly obvious. For example, it is well known that sodium hydroxide solution is caustic so the need to protect against exposure when using it as cleaning product is clear.

**Chronic Effects:** Longer term damage such as cancer, or liver damage are called chronic effects. It is also possible for an acute problem such as dermatitis to develop into a chronic problem if there is repeated exposure over a period of time. Chronic effects may often be much more difficult to recognise.

## NEW AND EXPECTANT MOTHERS

The *Management of Health and Safety at Work Regulations 1999* require employers to do a more detailed risk assessment on risks to pregnant workers. Some substances may pose particular risks to these women. For example, toxoplasmosis poses a particular risk during pregnancy and can be contracted through accidental ingestion when handling raw meat such as pork, lamb or venison. Where women of child-bearing age are employed any substances that pose a particular risk should be assessed and the woman who may be at risk should be informed. The assessment should be reviewed for any woman who does become pregnant. In addition it is good practice to include a question about pregnancy in your health questionnaire for women who visit the site and to make sure that they are informed of any pregnancy risks.

## MATERIAL SAFETY DATA SHEETS

For substances that are supplied for use in the workplace, the supplier should provide a Material Safety Data Sheet (MSDS). The MSDS should contain standard Risk Phrases that should help to identify any chemicals that may be hazardous. It should also provide information on safe storage, recommended use and safe disposal. Under European rules on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), manufacturers and suppliers of chemicals are required to include advice on risk management measures in their data sheets. So REACH should make it easier for users to use data sheets to help with their COSHH risk assessment.

## MANAGING HAZARDOUS SUBSTANCES UNDER COSHH?

A risk assessment should be done for any hazardous substances in the workplace. Suppliers MSDSs are a good place to start for substance that are used in manufacture or cleaning. Other sources of advice about hazardous substances that may be present include the HSE, trade associations and trade unions. The assessment should identify the hazards, the groups of workers who may be exposed and the prevention and control measures to be used. Remember to include foreseeable abnormal situations that may cause greater exposure – e.g. a spillage, a burst pipe or occasions where normally enclosed machinery has to be broken down for cleaning.

In April 2005 the regulations were modified. A new duty to comply with eight basic principles of good practice for any hazardous substance was introduced. These are:

- Design and operate processes to minimize emission or spread of hazardous substances
- Take account of all relevant routes of exposure
- Use control measures that are proportionate to the health risks
- Where possible use the most effective control measures that minimize the escape and spread of hazardous substances
- If adequate control cannot be achieved by other means use suitable personal protective equipment along with the other controls
- Check and review regularly to make sure that controls are working
- Inform and train all employees on the hazards and risks and the use of controls
- Make sure that the introduction of controls does not increase the overall risk to health and safety.

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This means there is a hierarchy of control measures that should be considered.

**Eliminating the Hazard** Is there a safer substance that can be used? Can the process be changed to prevent the production of hazardous fumes or dust? Can a safer form of the substance be used – e.g. if a powder produces a dust hazard, is there a pelletised form which is less dusty or can a pre-mixed solution be used to avoid the need for mixing?

**Enclosure** Isolating the source from the majority of workers can help. However some people may be exposed if there is a rupture in containment or if maintenance work has to be done inside the enclosed area.

**Ventilation** General ventilation that provides sufficient fresh air may be suitable for low-grade hazards. For some substances local exhaust ventilation (LEV) may be needed at the point where the dust or fume is produced. LEV should be designed to remove dust or fumes before they get into workplace air. The shape, size and location of the intake and the design of ducting and pipework can greatly affect the efficiency of the extraction. Dust or fumes drawn into the extraction system must be disposed of safely. Material Handling Dust or fumes are often produced when workers have to handle substances – e.g. to load products into a mixing vessel. Automation or mechanical aids can reduce the need to pour from sacks, drums or kegs. This can reduce the risk of dust, fumes or splashing and may also reduce manual handling risks.

**Organisational Controls** Restricting access to areas where hazardous materials are present reduces the number of workers exposed to risk. Good housekeeping to clean up spills and make sure that hazardous substances are properly stored can help. Washing and changing facilities may be needed for some workers. Workers exposed to the risk must be informed and should be trained so that they can follow the control procedures.

**Personal Protective Equipment** As a last resort or as a temporary measure – e.g. in emergency situations – workers may have to use PPE. PPE should be suitable for the job in hand and should comply with the relevant European standards.

For tight-fitting respirators (e.g. disposable masks, half masks and full face masks) the initial selection should include a fit-test to make sure that it is suitable for the wearer. The test must be done by a competent person using the appropriate test equipment and the test results should be recorded. Advice should be available from the supplier. Workers who are required to wear RPE should be trained in its use.

## MONITORING AND MAINTENANCE

As with any risk management system, there should be regular monitoring and review to make sure that control measures are working.

Under COSHH there are specific duties to test LEV systems at least once every 14 months and to regularly test RPE, other than one-shift disposable masks. Frequency of testing of RPE will vary and advice should be sought from suppliers. RPE that is rarely used – e.g. emergency breathing apparatus – must also be regularly checked and maintained in line with the supplier's instructions.

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## OCCUPATIONAL EXPOSURE LIMITS

At the same time as the new good practice principles were introduced, the complicated two-tier system of occupational exposure standards was replaced with a simpler system. Around 400 substances have been given a Workplace Exposure Level (WEL) that must not be exceeded. Most WELs are given as 8-hour time-weighted averages with a short term (15 minute) maximum within that.

Few of the substances encountered in the meat industry have a WEL, but there may be some. Certain areas like QC laboratories may use a range of solvents and other chemicals. Some cleaning products may give off fumes that contain chemicals that have a WEL. There is a WEL for carbon dioxide. Argon and nitrogen do not have WELs and are not directly harmful. However, they can act as asphyxiants. In areas where gases of this type are used it may be necessary to monitor oxygen levels.

There is a general WEL for all inhalable dusts of 10mg. per cubic metre over 8 hours or 4 mg. per cubic metre for dust that is fine enough to be respirable (i.e. breathed deeper into the lungs). However some dusty materials will have their own WEL.

For substances that cause asthma, cancer or inheritable genetic damage, exposure must be reduced below any WEL to the lowest level reasonably practicable.

Flour dust, for example, is an occupational asthmagen. It has a WEL of 10 mg per cubic metre of air over 8 hours, with a short term limit of 30 mg per cubic metre over any 15 minute period. But because it causes asthma the legal duty is to get exposure as far below that standard as is reasonably practicable.

Ultra-violet (UV) sanitising equipment is increasingly being deployed within the meat processing industry; for example exposed lamps in processing rooms which are turned on after the workforce have left; attached to conveyers, and in chillers, particularly in butchers' shops.

At high wattage, the UV light emissions help destroy bacteria. This equipment has the potential, under certain work place conditions, to emit high levels of UV light, which can be a hazard to human health.

Under the [control of artificial optical radiation at work regulations 2010](#) use of UV radiation exposure should be subjected to an [assessment of the risk of adverse health effects to the eyes or skin created by exposure to artificial optical radiation at the workplace](#).

Guidance on this important issue can be found at [guidance for employers](#).

## HEALTH SURVEILLANCE

COSHH requires health surveillance to be used where there is known exposure to a substance that causes a specific effect that can be detected by valid techniques. Health surveillance could be something as simple as training a supervisor to inspect the hands of workers where there is a known risk of dermatitis. Or it could be something more sophisticated – e.g. lung function testing where there is exposure to a substance that is known to cause asthma. Where health surveillance is needed a health record should be kept for each employee.

Monitoring of airborne exposure levels and health surveillance are not alternatives to controlling exposure, but they do help to monitor the effectiveness of the control measures that are used.

## COSHH ESSENTIALS – PRACTICAL GUIDANCE ON CONTROL MEASURES

To help employers decide on the appropriate control measures for chemicals they use, the HSE has developed a guidance approach called [COSHH Essentials](#). The website gives instruction on how to work through the guidance for the particular chemical or substance you are interested in and allows you to print off records and details of control methods for your risk assessment.

The starting point for COSHH Essentials is the MSDS from the supplier. Health hazards should be identified by standard risk phrases like “R21 Harmful in contact with the skin” or “R43 May cause sensitisation by skin contact”. The guidance explains how to use these risk phrases to allocate the substance to one of five hazard groups. It then advises how to score the substance depending on the quantity used and how dusty or volatile it is. Finally it refers the user to a set of guidance sheets with the appropriate control measures depending on the score the substance achieves. The guidance sheets cover common manufacturing processes like sack emptying, mixing, etc.

## COSHH HAZARDS IN THE MEAT INDUSTRY

**Infectious Risks** There is a possibility of zoonotic infections from the handling of animals. Possible hazards include bacteria such as campylobacter and salmonella, viral infections such as orf from sheep, fungal infections such as ringworm and parasites such as toxoplasmosis. In practice serious infections are rare among slaughterhouse workers and meat handlers. The standard hygiene controls appear to be effective at controlling the risk. However there may still be a risk so in some plants the risk will have to be assessed and employees informed about it. For example Q Fever continues to be a cause for concern where sheep, goats and cattle are slaughtered. (See BMPA GN 2-34 for further information).

The HSE produces guidance on the [common occupational zoonoses](#).

**Cleaning and Disinfectant Materials** Many cleaning materials used in the industry are irritant and some are toxic. Problems can be worse if certain types of material are mixed together. [The HSE publishes a useful information sheet on disinfectants](#).

**Food Ingredients** Although they are safe to eat some food additives and ingredients can be hazardous when workers are exposed in the workplace. Flour dust is the second commonest cause of occupational asthma in the UK. Other spices or seasoning products can be irritant or can cause allergies. The Seasoning and Spice Association provide advice on appropriate exposure levels. For example, dried horseradish flakes/granules, whole and ground mustard seeds, ground cayenne, chilli powder, ground black and white pepper, and galangal (Thai ginger) are irritants. The SSA recommends an exposure limit of 3 mg. per cubic metre (as opposed to 10 mg. per cubic metre for general nuisance dusts). Garlic powder, celery powder and celery seeds are identified as potential sensitisers (i.e. they may cause asthma) and exposure should be reduced as low as is reasonably practicable – certainly well below the nuisance dust exposure limit. Meat tenderisers containing proteolytic enzymes are also sensitisers. The risk can be reduced by use of aqueous solutions of enzymes, but care must still be taken to avoid splashing or the formation of aerosols. Advice is available from the Seasoning and Spices Association.

#### **FURTHER INFORMATION**

**Control of Substances Hazardous to Health (4th Edition) L5, HSE Books**

Contains the COSHH regulations 2002 and Approved Codes of Practice and Guidance.

**COSHH Essentials: Easy Steps to Control Chemicals, HSG193, HSE Books**

**Selection, Use and Maintenance of Respiratory Protective Equipment: A Practical Guide, HSG53, HSE Books**

**Fit Testing of Respiratory Protective Equipment Facepieces, HSE Operational Circular 282/28**

**Controlling Airborne Contaminants at Work – A Guide to Local Exhaust Ventilation**

**The Occupational Zoonoses, ISBN 0 11 886397 5, HSE Books**

**Controlling exposure to disinfectants used in food and drink industries, HSE Food Information Sheet no. 29**

**Occupational Dermatitis**

**For advice on hazards from seasoning and spice ingredients contact Seasoning and Spice Association**

6 Catherine Street, London WC2B 5 JJ

Tel: 0171-8362460 Fax: 0171-8360580

**List of approved Workplace Exposure Levels**

<http://www.hse.gov.uk/coshh/index.htm>

## Vulnerable Employees in the Meat Industry

(New Guidance Note April 2015)

A vulnerable employee is someone who is at greater risk of injury or ill health. Examples of vulnerable employees are set out below.

### YOUNG PERSONS

A **young person** is anyone under 18, and

A **child** is anyone who has not yet reached the official minimum school leaving age (MSLA). Pupils will reach the MSLA in the school year in which they turn 16.

An employer has a responsibility to ensure that young people employed by them are not exposed to risk due to their

- lack of experience,
- being unaware of existing or potential risks, and/or
- lack of maturity both physical and mental.

If you are considering employing or offering work experience to a young person or child you need to ensure that your risk assessments carefully consider the implications. In some circumstances, the risk assessment may conclude that the opportunity cannot proceed. In some circumstances, whilst an opportunity can proceed there may be prohibitions applied, particularly in respect of the use of work equipment.

The HSE provide helpful guidance on this issue which can be accessed on their website via this link (obtained by searching 'Young Persons' on the HSE site)  
<http://www.hse.gov.uk/youngpeople/law/index.htm>

### NEW AND EXPECTANT MOTHERS

Many women continue to work throughout the duration of their pregnancy without experiencing any problems if risks are correctly identified and properly managed. Failure to properly manage such risks put pregnant workers, their unborn babies, and new mothers who continue breastfeeding after returning to work at risk of injury and ill health.

Under the Management of Health and Safety at Work Regulations 1999, employers are required to assess specific risks to female employees of childbearing age who become pregnant and any risks to new and expectant mothers. This can be part of, or an extension to, existing workplace risk assessments which are also a legal requirement under the above regulations. The employer must take such action once notified in writing by the employee or their doctor.

The assessment should consider the following:

- work processes
- working conditions
- physical, chemical and biological agents

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The risk assessment should identify appropriate and sensible action to remove, reduce or control the risks. However, if the risks cannot be removed the employer should

- temporarily adjust the employee's working conditions and/or hours of work; or, if this is not possible,
- offer the employee suitable alternative work on the same rate of work; if available, or, if this is not feasible,
- suspend the employee from work on paid leave for as long as is necessary to protect her health and safety and that of her child.

A new or expectant mother can continue to work nights if this does not pose a risk to her or her unborn child. However, if there is a specific risk or she has been provided with a medical certificate by her GP or midwife stating that it will affect her health then the employer must offer the employee suitable alternative day work on the same terms and conditions. If this is not possible then the employer must suspend the employee from work on full pay for as long as is necessary to protect her health and safety and that of her unborn child.

Employers should review any completed risk assessments to ensure that the circumstances have not changed and that existing control measures remain effective. This is to ensure that different stages of the pregnancy do not pose risks not previously identified. Employers should also consider the health and safety risks to those mothers who are breastfeeding, such as exposure to lead and chemicals.

### **OLDER WORKERS**

An aging population, the increase in retirement age and a willingness and need for people to remain in work for longer mean that the number of older workers is forecast to rise in forthcoming years as people stay in employment longer.

Although a person's age is not a reflection of their personal capacity to work, as they get older their ability to do their job may change. As a result of this, employers may need to consider ways of ensuring older workers remain safe and healthy at work. It is important to remember that European Union equality laws make it illegal to discriminate against employees or people seeking work because of their age. All workers regardless of age have the same right of recruitment, training and promotion.

Everyone ages differently and employers should not automatically assume that certain jobs are not suitable for older workers. When assessing health and safety risks to older workers, their colleagues and someone's suitability for a job, employers must consider the person's individual capabilities and the actual health and safety risks as part of their decision making process. Physical strength and endurance is very specific to individuals and can be influenced by factors such as general health rather than the ageing process.



Factors that could affect someone's ability to stay healthy and safe while at work should be taken into account during risk assessments and when drawing up safe systems of work. By doing this, employers can ensure that older workers can enter and remain in work while staying safe. The HSE advises that employers should

- carry out risk assessments routinely and not just when an employee reaches a certain age,
- assess the activities to be carried out and modify workplace design if necessary,
- make adjustments on individual and business needs and not age,
- consider modifying tasks to allow people to stay in work longer and provide re-training if required,
- allow flexible working or change work hours and job content,
- not assume that certain jobs cannot be done by older worker, base decisions on capability not age,
- encourage or provide regular health checks for all employees regardless of age,
- introduce health and wellbeing programs so that employees take an interest in their own health and fitness,
- consider the legal requirements under the Equality Act 2010 which could require a business to make adjustments to help an employee with a disability or health condition to enter or remain in work.

### **MIGRANT WORKERS**

Migrant workers can be at risk if they fail to understand warning signs and instructions. The factors could include migrant workers failing to understand the local language, poor literacy and numerical skills and cultural differences as the UK may have more stringent health and safety regulations than their home country.

UK health and safety legislation affords the same protection equally to all employees and this means that employers must take the same steps to protect the health and safety of migrant workers as they would any other member of staff.

A migrant worker is defined as someone who is or has been working in the UK in the last twelve months and has come to Britain from abroad to work in the past five years. The responsibility for the health and safety of migrant workers depends upon the relationship between the labour provider, such as the employment agency or gangmaster, and the labour user who is defined as the final employer. Labour providers and users should agree in writing their respective day to day responsibilities for the management and supervision of migrant or supplied workers. This could be, for example, the provision of personal protective equipment and information, instruction and training.

When carrying out risk assessments, employers should consider factors such as language difficulties, basic competencies such as literacy, relevant work experience and whether any vocational qualifications are compatible with the UK.

Suitable control measures could include:

- providing health and safety information, induction training, and any necessary on the job related training,
- ensuring that migrant workers are adequately supervised and can communicate effectively with their supervisors,
- ensuring migrant workers can raise concerns about health and safety and any necessary emergency procedures.

If migrant workers have difficulty in speaking, understanding or reading English, a number of precautions can be taken to ensure their health and safety. These include:

- providing training courses for longer-term workers with the aim of improving their language, reading and writing skills,
- using interpreters when conducting health and safety training,
- using a buddy system to pair inexperienced migrant workers with experienced ones who speak the same language,
- replacing written instructions with clearly understood symbols and diagrams,
- using simple, clear English in training sessions and training supervisors in how to communicate clearly.

#### DISABLED WORKERS

Approximately one in five people in the UK of working age are thought to be disabled. Many have short or long term health conditions and injuries which force them to be absent from work. Research has shown that disabled employees are just as productive as their colleagues, but in some cases disabled people are discriminated against when securing or staying in work. In addition to this, health and safety concerns are accidentally or deliberately used as a false reason for failing to employ or continuing to employ disabled people with an injury or ill health condition.

Under the Equality Act 2010 it is discrimination to treat a disabled person less favourably because of something connected to their disability. Employers must make reasonable adjustments to jobs and the workplace to ensure that disabled people have equal opportunities. The Equality Act 2010 defines a disabled person as someone who has a physical or mental impairment that has a substantial and long term effect on their ability to carry out normal day to day activities such as reading, writing and holding a conversation. Examples of these are

- Blindness
- Deafness
- Depression
- Multiple Sclerosis
- Epilepsy
- Cancer
- Back Pain\*
- Dyslexia\*
- Asthma\*

\*If they have a long term adverse effect on the individual

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When an employer employs or is considering employing a disabled person they must consider the risks to their health and safety. They must make reasonable adjustments to enable them to stay or enter into work. It is important that employers do not make assumptions about the safety implications of a person's disability as this could lead to discrimination. A person's disability may not make a difference to the workplace risks.

The risk assessment completed by the employer will need to take into account the person's disability and the effect it will have on their own safety and others. Reasonable adjustments to allow a disabled person to stay or enter the workplace could include:

- adjustments to the workplace to improve access and layout,
- changing the working hours, flexi time, job share, starting later and finishing earlier,
- installing new or adapting equipment to make it easier for them to use,
- allowing time off for treatment, assessment and rehabilitation,
- modifying instructions or procedures such providing them in larger text or Braille,
- providing alternative work, though this should be the last resort.

#### **SOURCES OF INFORMATION**

**The Equality Act 2010**

**The Management of Health and Safety at Work Regulations (as amended) 1999**

**The Health and Safety Executive**

**The British Safety Council**

## Standards for Food Machinery Safety

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Machinery purchased after 1 January 1995 must comply with the Machinery Directive 98/37/EC, enacted by [The Supply of Machinery \(Safety\) Regulations 1992](#).

Compliance with the directive must be achieved by ensuring that the “essential health and safety requirements” (EHSR) have been met. The EHSRs are described in the directive, but for an increasing range of machines there are now specific standards, and compliance with these standards is considered to be compliance with the directive.

These standards are harmonised across the EU and published in the UK as BS ENs. The British Standards listed below provide the safety design requirements for food processing machinery. Many of these Standards have been updated since publication (e.g. BSEN1673:2000 was updated in 2009 to become BSEN1673:2000+A1:2009) – these regular updates are not shown on the tables below.

The list below is a selection of standards covering the main topics for the meat and bakery industry. The Standards are based on European CEN Standards and are available from the British Standards Institution Tel: 020 8996 9001.

### 1. STANDARDS FOR SPECIFIC MACHINES

#### Meat Machinery

BS EN 1974	Slicing machines
BS EN 12355	Derinders, skinning and membrane removal machines.
BS EN 12267	Circular Saws
BS EN 12268	Bandsaws
BS EN 12855	Rotating bowl cutters
BS EN 13871	Cube Cutting machines
BS EN 12331	Mincers
BS EN 12463	Filling machines
BS EN 12984	Portable / hand operated machines
BS EN 13570	Mixers & Blenders
BS EN 13870	Chop Cutters
BS EN 13288	Bowl lifters
BS EN 13885	Clipping machines

#### Bakery Machines

BS EN 453	Dough mixers
BS EN 454	Planetary mixers
BS EN 1673	Rotary rack ovens
BS EN 1674	Dough and pastry brakes
BS EN 12041	Moulders
BS EN 12043	Intermediate provers
BS EN 13390	Pie and tart machines

### Packaging Machinery

- BS EN 415 Pt 1 Terminology and classification
- Pt 2 Pre-formed rigid container machines
- Pt 3 Form, fill and seal machines
- Pt 4 Palletisers and depalletisers
- Pt 5 Wrapping machines

### Hygiene

- BS EN 1672 Pt 2 Basic concepts, Hygiene requirements

## 2. RELATED TO PEOPLE

- BS EN 294 Safety distances to prevent danger zones being reached by upper limbs.
- BS EN 811 Safety distances to prevent danger zones being reached by lower limbs.
- BS EN 349 Minimum gaps to avoid crushing parts of the human body.
- BS EN 547 Pt 1 Principles for determining the dimensions required for opening for the whole body access into machinery.
- Pt 2 Principles for determining the dimensions required for access openings.
- Pt 3 Human body measurements – Anthropometric data.
- BS EN 7250 Basic human body measurements for technological design.
- BS EN 999 Positioning of protective equipment in respect of approach speeds of parts of the human body.
- BS EN 1005 Pt1 Human physical performance – Terms and definitions
- Pt3 Recommended force limits for machine operation.
- BS EN 563/A1 Temperatures of touchable surfaces (amended 1999)

## 3. MACHINE DESIGN

- BS EN 292 Pt1 Basic terminology – general principles for design.
- Pt 2 Technical principles and specifications.
- BS EN 953 General requirements for the design and construction of fixed and movable guards
- BS EN 982 Fluid power systems and their components (Hydraulics)
- BS EN 983 Fluid power systems and their components (Pneumatics)
- BS EN 60204 –1 Electrical equipment of machines (1997)
- BS EN 60529 Degrees of protection provided by enclosures (IP code)

## 4. MACHINE CONTROLS

- BS EN 418 Emergency stop equipment, functional aspects. Principles for design.
- BS EN 574 Two-handed control devices.
- BS EN 954 Pt1 Safety-related parts of control systems – General principle.
- BS EN 1037 Prevention of unexpected start-up.
- BS EN 1088 Interlocking devices associated with guards. Principal for design and selection.
- BS EN 61496 Pt1 Electro-sensitive protective equipment – general requirements and tests.

## 5. SIGNS AND AUDITORY SIGNALS

- BS EN 981 System of auditory and visual danger and information signals.
- BS EN 61310 Pt1 Indication, marking and actuation. Requirements for visual, auditory and tactile signals.
- Pt2 Requirements for marking.
- Pt3 Requirements for the location and operation of actuators.

## 6. NOISE (ACOUSTICS)

- BS EN 3743 Pt1 Determination of sound power levels of noise sources. Comparison method for hard-walled test rooms.
- Pt2 Methods for special reverberation test rooms.
- BS EN 3744 Determination of sound power levels of noise sources using sound pressure. Engineering method in an essentially free field over a reflecting plane.
- BS EN 3746 Determination of sound power levels of noise sources using sound pressure. Survey method using an enveloping measurement surface over a reflecting plane.
- BS EN 9614 Pt1 Determination of sound power levels of noise sources using sound intensity. Measurement at discrete points.
- BS EN 11200 Noise emitted by machinery & equipment – Guidelines for the use of basic standards for the determination of emission sound pressure levels at work station and at other specified positions.
- BS EN 11201 Measurement of emission levels at a work station and at other specified positions. Engineering method in an essentially free field over a reflecting plane.
- BS EN 11202 Measurement of emission sound pressure levels at work station and at other specified positions. Survey method in situ.
- BS EN 11203 Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level.
- BS EN 11204 Measurement of emission sound pressure levels. Method requiring environmental corrections.
- BS EN 11546 Pt1 Determination of sound insulation performance of enclosures. Measurement under laboratory conditions (for declaration purposes)
- Pt2 Measurement in situ (for acceptance and verification purposes)

## 7. RISK ASSESSMENT

- BS EN 1050 Principles for risk assessment.

## 8. MISCELLANEOUS

### Fire Protection

- BS EN 13478 Fire prevention and protection.

### Battery Operated Trucks

- BS EN 1175 Pt1 Electrical requirements. General requirements for battery-powered trucks

## Managing Manual Handling Risks in the Meat Industry

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### INTRODUCTION

This guidance note summarises current health and safety legislation applicable to manual handling risks. The information is intended to outline issues relevant to the meat industry and provide practical guidance on methods of reducing risk. It should not be considered as an alternative to the requirements of the legislation or a risk assessment.

Manual handling risks fall into the general category of musculoskeletal disorders (MSD's) which are problems affecting the muscles, tendons, ligaments, nerves or other soft tissue or joints.

Musculoskeletal disorders (MSDs) are the biggest cause of occupational ill health in the UK. Forty per cent of all MSDs involve the upper limbs and neck. Nationally, 1 in every 10 days of work lost is due to upper limb disorder pain.

### CHALLENGES

The meat industry has traditionally needed to use the manual skills of its employees in most of its processing tasks. Automation and mechanisation have been progressively introduced but it can be difficult or expensive to automate these tasks. Knife work, packing, and picking, for example, have relied on manual dexterity and in some situations replacing operatives with machinery may not be practicable.

Skilled workers tend to remain on certain jobs e.g. boning, often for many years. This is challenging for employers to manage, particularly where work patterns encourage employees to work at a fast pace such as on piecework, at premises where workers can finish early if they complete their set tasks or where bonus schemes operate. These factors increase the risk of developing musculo-skeletal disorders.

Larger businesses have more scope to reduce and control risks, but smaller companies, like butchers, may not be able to afford specialist handling equipment. However, by taking a fresh look using risk assessment techniques, some of the risk factors can be reduced or eliminated. For example, simply keeping floors free of slip and trip hazards may significantly reduce the risk.

### WHAT IS MANUAL HANDLING?

The Manual Handling Operations Regulations 1992 (as amended) States:

*“Manual handling operations” means any transporting or supporting of a load (including the lifting, putting down, pushing, pulling, carrying or moving thereof) by hand or bodily force. A ‘load’ includes any person and any animal.*

Table 1 outlines some of the more common manual handling risks in the meat industry.

TABLE 1

<p><b>Lairage</b></p> <ul style="list-style-type: none"> <li>Opening &amp; closing gates &amp; partitions</li> <li>Closing vehicle ramps</li> <li>Pushing &amp; pulling animals</li> </ul>	<p><b>Abattoir</b></p> <ul style="list-style-type: none"> <li>Slinging</li> <li>Legging</li> <li>Removing heads</li> <li>Reaching from platforms</li> <li>Carrying hooks</li> </ul>	<p><b>Chills</b></p> <ul style="list-style-type: none"> <li>Quartering saws</li> <li>Pushing sides</li> <li>Carrying quarters &amp; sides</li> </ul>
<p><b>Butchery</b></p> <ul style="list-style-type: none"> <li>De-boning</li> <li>Handling primals</li> <li>Handling bones</li> <li>Pushing tote bins</li> </ul>	<p><b>Packing</b></p> <ul style="list-style-type: none"> <li>Boxes &amp; trays</li> <li>Lifting pallets</li> <li>Moving pallet trucks</li> <li>Moving equipment</li> </ul>	<p><b>Maintenance</b></p> <ul style="list-style-type: none"> <li>Toolboxes</li> <li>Large components</li> <li>Gas cylinders</li> <li>Awkward access</li> </ul>

### WHAT DOES THE LEGISLATION REQUIRE?

The [Health and Safety at Work etc Act 1974](#) Section 2 requires that employers provide systems of work that are safe, so far as is reasonably practicable. The [Manual Handling Operations Regulations 1992 \(as amended\)](#) require, so far as is reasonably practicable, the avoidance of manual handling likely to cause injury. Where manual handling cannot be avoided, employers are required to:

1. Carry out a suitable and sufficient assessment of risks from manual handling.
2. Take appropriate steps to reduce risk of injury from manual handling.
3. Provide information to people engaged in manual handling about the weight and characteristics of the load.
4. Provide suitable and sufficient information, instruction, training and supervision to enable employees to work safely.

### LIMITATIONS WHEN LIFTING AND HANDLING

The guidance on the regulations includes a risk assessment filter within which guideline weights for lifting and lowering are presented. This takes into account the various lifting zones in relation to both males and females. This varies significantly between males and females, whether one or more people lift an object together, the frequency of lifting, the nature of load itself and the prevailing environmental conditions. For these reasons these weights should not be regarded as a total measure of the risk but only a discrete part of it.

### MAKING AN ASSESSMENT

The regulations and associated guidance provide employers with a systematic method of assessing which risk factors that may apply during manual handling tasks. The assessment table contained in the code of practice breaks the task of manual handling into elements and asks what risk factors may be present.

It is essential for legal compliance to have a competent person carry out risk assessments.



Some simple assessments require a basic competence, which can be gained from reading the regulations and following the guidance. More complex risks will require greater competence, for example; where young or pregnant workers are involved or employees who may have an existing health condition which limits their capacity for lifting and handling.

### MANUAL HANDLING ASSESSMENT CHART (MAC)

The Health and Safety Executive has designed the MAC to help inspectors assess the most common risk factors. The MAC is also available to employers. The publication examines elements of manual handling tasks involving; lifting, carrying and team handling operations. Each element can then be assessed and risks levels classified as Low, Medium, High and Very High using the numerical and colour coded guides.

### REDUCING THE RISK

The task itself will dictate what measures can be taken to reduce manual handling risks. Some simple measures include: tool balancers for heavy equipment; maintenance of wheels on pallet trucks; cleaning and maintaining floors to provide good grip; reducing the weight of loads and carrying distances; reducing twisting and reaching; simple handling equipment e.g. using a sack barrow instead of carrying sacks and brakes on trolleys used on ramps.

### ASSESSMENT OF REPETITIVE TASKS

It is helpful to remember that an assessment of manual handling risks may not necessarily provide a suitable and sufficient measure of the risks associated with all repetitive tasks. Repetitive tasks are typically found in assembly, production, processing, packaging, packing and sorting work, as well as work involving regular use of hand tools. Often these do not involve lifting or carrying heavy weights but do involve the application of force or twisting and turning of the arms, wrists, elbows etc. [The HSE's Assessment of Repetitive Tasks \(ART\) tool](#) is designed to help you risk assess tasks that require repetitive movement of the upper limbs (arms and hands). It assists you in assessing some of the common risk factors in repetitive work within the meat industry that contribute to the development of Upper Limb Disorders (ULDs). The ART tool is intended for people with responsibility for the design, assessment, management, and inspection of repetitive work including that undertaken within the meat industry.

### REFERENCES

**The Manual Handling Operations Regulations 1992 (as amended) and guidance, HSE Books, L23, ISBN 071762823X**

**Moving food and drink: Manual handling solutions for the food and drink industries. HSE Books HSG196 ISBN 0 7176 1731 9**

Both the Manual Handling Assessment Chart Tool (MAC) and the Assessment of Repetitive Tasks Tool (ART) can be downloaded from the HSE's website [www.hse.gov.uk](http://www.hse.gov.uk)

## Workplace Transport

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This guidance note is intended to give an overview of the principles of managing the safe operation of vehicles within the meat industry. There are many regulations, codes of practice and other guidance covering these areas, often however these are specific to particular risks. A list of relevant publications can be found in the appendix.

The areas and operations to be considered are:

**1. Vehicles on site, these may include:**

- a) Fork lift trucks, rough terrain trucks and reach trucks.
- b) Factory shunter unit.
- c) Company owned road vehicles, and haulier's vehicles. These may be articulated, rigid bodied, small vans and livestock transporters.
- d) Staff cars.

**2. Vehicles on the road, these may include:**

- a) Goods vehicles.
- b) Company cars.
- c) Private cars used on company business

### ON SITE

There are many potential hazards with vehicles on site, and all have the potential to result in death or major injuries and include

- Pedestrians being run over
- Falling from vehicles
- Unexpected movement, causing crushing or falling with trucks

**1. Pedestrian/Vehicle Separation**

The best approach to ensure the higher risks identified and prioritised is to start with a site plan and then mark the routes for different vehicles and people using a colour code. It is very important to include volumes, for example a main factory entrance will be used by the entire workforce whereas a storage area may only be accessed by one or two pedestrians to check the stock etc. and therefore likelihood of an accident is reduced. The same rule would apply to vehicle routes. The necessary controls can then be considered. Here are some questions which may be useful:

- Have safe traffic routes been planned - preferably with one-way systems and, if needed, pedestrian crossing points?
- Are vehicles and pedestrians kept safely apart by, for example, provision of safe pedestrian routes both outside and inside? (where possible separation should be provided by physical barriers rather than just markings). Where pedestrians and vehicles cannot be entirely separated, points where they meet should be defined with markings and warning signs.
- Do vehicles and pedestrians have separate doors into buildings with suitable barriers where required?
- Are appropriate speed limits enforced and, where required, speed bumps installed?
- Are adequate signs in place, e.g. indicating direction, speed limit, no entry, etc., and mirrors fitted on blind corners?
- Are vehicles, including private cars, parked in designated areas?

- Is access to loading yards restricted to essential personnel and are they wearing high visibility clothing?
- Can deliveries etc. be planned to avoid unsuitable times such as shift changeover?

### 2. Vehicle Reversing

- Can reversing be eliminated or at least reduced, for example by one-way systems?
- Do vehicles have adequate all round visibility? Are mirrors, reversing cameras and audio reverse aids fitted?
- Do the vehicles need to have reversing alarms fitted?
- Is there need to mark 'reversing areas' so these are clear to drivers and pedestrians?
- Is there a need for a signaller (banksman)? The need for a banksman should be eliminated if possible by other means e.g. cameras and reverse alarms.
- If a signaller has to be used have they been trained to keep the reversing area clear of people and to make sure the reversing manoeuvre is done in a safe manner. Do the signaller and driver both understand what signals are to be used. The HSE gives guidance on recommended signals in the leaflet Reversing Vehicles, INDG148.

### 3. Falls from Vehicles

- Fork lift trucks should not be used to put people onto vehicles if this can be avoided, proper access steps should be provided. If a truck has to be used then it must be fitted with a man cage.
- On all vehicles, are access to cab arrangements well designed with suitable slip-resistant steps and handholds?
- On refrigerated vehicles, is access to controls and instruments possible without ascending ladders?
- Tankers: when it is necessary to access the top of a tanker the best option is a fixed platform with rails and a trap door to access the lids. Tankers may be fitted with a platform and fold down rails. Where there is no rail or only on one side a harness should also be used.

### 4. Lighting

All roads, manoeuvring areas and yards should be adequately lit, with particular attention being given to areas near junctions, buildings, plant, pedestrian areas and places where there is regular movement of vehicles or mobile equipment.

### 5. Vehicle Design and Maintenance

- Layout of controls and cab design can affect the driver's health – particularly when long periods are spent driving the vehicle. It is good practice to involve the workers who will use the vehicle in the specification and purchasing process when buying new workplace vehicles.
- The floor should be of slip resistant material where practicable
- At the rear a substantial stepping bar and a good hand grip should be provided
- Rail hooks must be free running and strong enough to withstand spreading
- There should be safety catches on rail ends which prevents a runner falling
- Lifting equipment should be examined in accordance with the [Lifting Operations and Lifting Equipment Regulations \(LOLER\) 1998](#).

- Part loads and other loads liable to fall must be properly secured while the vehicle is moving
- Shunter units: shunter units specifically designed for the job should be considered rather than road units as they have a much tighter turning circle of 55 degrees, all round vision, a safe working platform and a lifting fifth wheel eliminating the need to raise trailer legs. shunter drivers must be trained.
- Livestock transporters must meet the requirements of Council Regulation(EC) No 1/2005 on [The Protection of Animals During Transport and related Operation and the Welfare of Animals \(Transport\) Regulation \(NI\) 2006](#)  
Safety aspects of design can be found in the BMPA Health and Safety Guidance note GN 2-35, '[Safety When Handling Cattle in Slaughterhouses](#)'.
- Industrial trucks must be of the correct specification for the work and environment, e.g. capacity, reach and height, rough terrain or uneven surfaces. Drivers should be trained in accordance with the [HSE ACOP Rider-operated lift trucks, operator training.3LI 17](#)

### 6. Loading Bays

Where possible the height of the loading bay and the floor of the vehicle should be equal but where this is not the case ramps or steps may be used.

#### *Steps should;*

- Be sufficiently strong and rigid
- Be at least 900mm wide (36")
- Have slip resistant treads about 250mm deep with risers about the same
- Be fitted with a handrail on the left-hand side
- Have a landing area at the top
- Be fixed securely when in use

#### *Ramps should;*

- Be slip resistant
- Have a maximum slope of 1 in 6
- Be fitted with a handrail on the left-hand side
- Be sufficiently strong and rigid
- Be fixed securely when in use

### 7. Coupling and Uncoupling

Coupling and uncoupling can have serious risks if not carried out safely. Hauliers and site operators should ensure that areas where vehicles are coupled and uncoupled are well lit (by natural or artificial light), firm, and level. Vehicle stops, handholds and lighting (e.g. at the cab rear) should be provided and used where appropriate. Drivers should be properly instructed in coupling procedures and safety.

Where vehicles must be 'split coupled' or 'close coupled' because of lack of room between the trailer and tractor unit, the trailer parking brake must be properly applied before coupling or uncoupling. See [Workplace transport safety HSG 136](#).

### 8. Loading and Unloading

Very serious accidents have been caused by premature departure of vehicles from loading bays. Traffic lights have limited effect usually in preventing this as this system relies on people as is the case when unit keys are handed in with the consignment paperwork. The key system often does not work as the driver has a second key, but it can work better if the driver is made to lock and leave the cab and go to a rest room until called. This system does not work if trailers are being shunted. Vehicle restraint systems which work in conjunction with the roller door and/or dock leveller take out the reliance on people and procedure. These can either be a key swap device which locks onto the airline suzie of the trailer and then unlocks the door and/or leveller or chocks that operate with the dock leveller.

### 9. Systems of Work

- Carcasses, quarters and primal cuts should be hung so that bone or ligament tissue supports the weight.
- S hooks with sharp points should be avoided particularly the smaller versions
- Boxed meat, offal or poultry should be bonded during loading particularly at the rear door of vehicles.
- Vehicle doors should be opened carefully and used as protection against badly stacked and displaced loads
- Good housekeeping is important. Grease, fats and uncut box bands must be removed with a full cleaning and disinfection procedure between loads, but there may also be build up during loading and unloading so a 'clean as you go' policy should also be applied.

### ON THE ROAD

Employer's responsibility for work related road safety and the HSE's enforcement policy. Driving for work is being treated in exactly the same way as any other area of health and safety at work. Subsequently employers must have a driving policy, suitable and sufficient assessments of risk, procedures and monitoring systems in place. It is also recommended that drivers are trained in defensive driving techniques. The police will in most cases, continue to take the lead on the investigation of road traffic incidents on the public highway. Enforcement action by the HSE will usually be confined to incidents where the police identify that serious management failures have been a significant contributory factor in the incident.

### The 'Grey Fleet'

Effective transport and driving policies should also consider the use of company cars and private cars on company business. Employers should review what arrangements they have in place to ensure that authorized drivers have adequate insurance, are driving roadworthy vehicles, have a valid drivers licence and are medically fit to drive. Other important considerations will be why, when and how such vehicles are being used. Further guidance including assessment of road driving risks can be found in [Driving at Work INDG382](#).

### DELIVERY

There are of course many different situations at the recipient's premises. The delivery point may be a factory or warehouse with good site traffic management through to back yards of retail shops to even unloading on the street. In all situations there are three duty holders and these are:

- The supplier sending the goods
- The carrier
- The recipient

Cooperation and good communication is necessary to ensure the risks are adequately assessed and suitable controls are put in place. The operations to be considered are the same ones as at the supplier end around manoeuvring the vehicle into the unloading position safely and the actual unloading and the controls to manage people and other vehicles may also be similar. However there may be other factors that increase the likelihood of accidents which are not so easily controlled for example the general public and other road users. In addition to vehicle- people risks there may also be risk of spillages creating hazards for other vehicles and the public. Driver training on delivery procedure is essential and if the driver has any doubts about the safety of the delivery then he/she must call into base to be advised.

### Monitoring

All transport operations require continuous management and monitoring to ensure procedures and safety standards are maintained. One of the best ways to monitor these operations is through regular formal job observations.

### APPENDIX

#### REFERENCES AND FURTHER READING

**Workplace (Health Safety and Welfare) Regulations 1992**

**Lifting Operations and Lifting Equipment Regulations (LOLER) 1998.**

**The Protection of Animals During Transport and related Operation and the Welfare of Animals (Transport) Regulation (NI) 2006**

**BMPA Health and Safety Guidance note GN 2-35, 'Safety When Handling Cattle in Slaughterhouses'.**

**HSE ACOP Rider-operated Lift Trucks, Training.3L117**

**Driving at Work INDG382**

**HSE Health and Safety in Road Haulage <http://www.hse.gov.uk/haulage/>**

**Warehousing and Storage: A Guide to Health and Safety**

**HSG 136. Workplace Transport Safety. A Guide for Employers.**

**HSG 6 Safety in Working with Lift Trucks**

**Reverse and safety signals for guidance of drivers Road Transport**

**Industry Training Board (RTITB)**

The HSE website also gives advice on workplace transport at the following sites: <http://www.hse.gov.uk/workplacetransport/index.htm>

## Thermal Comfort

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### INTRODUCTION

Workers in the meat trade may have to work in a variety of thermal environments.

The main part of this guidance is concerned with work in cold stores where the air temperature is well below zero. But there can be health and welfare issues for workers in chilled areas from +12 degrees down to just below zero. The HSE provides advice on this issue on the [food industry pages](#) of their website.

The 'comfort zone' for most workers is in the range of 13 degrees C to 24 degrees C. Once temperatures start to rise above about 24 degrees it can start to get uncomfortably warm. Thermal comfort in this temperature range is a complicated issue. It relates to the individual worker's perception of how hot or cold they feel. This in turn can be influenced by a range of factors such as air temperature, sources of radiant heat, air velocity, humidity, the clothing the worker wears and how physically strenuous the work is. [The HSE gives some guidance on its website on how to manage thermal comfort.](#)

At temperatures above 27 to 30 degrees C, the issue of heat stress becomes more important. Heat stress may also be a problem at lower temperatures for heavy work, high humidity or when workers have to wear certain types of protective equipment.

Heat stress occurs when the normal cooling mechanisms are unavailable and the body's core temperature starts to rise. Initial symptoms include irritability, loss of concentration, excessive sweating. In the extreme heat stroke can result in loss of consciousness and even death. HSE has published a useful information sheet for workplaces with cookers or ovens etc where heat stress can be an issue.

### WORKING IN COLD STORES

The rest of this Guidance refers to cold stores operating below freezing, typically -12 to below -30 Celsius.

Working in the cold conditions of Cold Stores is very different and requires special attention to safety by operators, maintenance engineers and management alike.

Operators should be healthy, a health check up before commencing duties and annually thereafter is recommended. The extremities of the body cool quickest and therefore fingers and head (nose, chin, ears) are the first to suffer. Protective clothing should at least ensure that the skin temperature does not fall below + 12°C at any of these parts of the body.

#### Health/ Welfare

A recent literature review conducted by the Health and Safety Laboratory concluded that there is insufficient information to say whether repeated exposure to cold environments has long-term effects on health. However there is evidence that some people may be more susceptible to injury and that the physiological and mental changes caused by exposure to cold may exacerbate other risks.

People suffering from certain medical conditions may be unsuited to work in cold stores. These include chronic respiratory disease, asthma, arthritis, cardiovascular disease and Raynaud's syndrome.

Hypothermia occurs when the core body temperature falls below 35 Celsius. Early symptoms include shivering, slurred speech and mental confusion. Victims may often be unaware of what is happening to them. Without re-warming death will result. Repeated brief interval exposures (such as workers entering and exiting freezers) can have a cumulative chilling effect. Although severe hypothermia is unlikely in a work setting, early symptoms can cause discomfort and can contribute to increased accident rates.

Other health problems can include frost nip, frost bite and chilblains. Risks of frost bite are greater where frozen product has to be handled without adequate protective clothing.

### Accidents

The presence of ice and slippery surfaces, combined with reduced manual dexterity because of bulky PPE and the mental and physical effects of cold temperatures can lead to an increased risk of accidents. Ice build up is likely to be most serious at the entrance to the cold store, which is also likely to be the busiest area.

### Musculoskeletal Disorders

Difficulty with gripping loads or manoeuvring because of PPE and reduced circulation of blood to the extremities can increase the risk of musculoskeletal injury. Cold draughts are particularly linked to shoulder and neck pain.

### Being Locked In

Safe means of exit must be available at all times, even if the door is locked from the outside. A 'man down' alarm controlled by a low level cord switch positioned near an order picking station gives a means of warning in the event of single operators becoming incapacitated.

### Slipping

This is the most common type of accident, usually on ice that has formed on the floor under the coolers. The defrost cycle must be maintained to prevent ice build up on coolers or let water be blown off during defrost. Drain lines should be heated throughout their length to minimise ice accumulation.

### Access to High Level Racking [Link to MHE](#)

Never climb on racking or temporary steps without secure fastening. Do not stand on a pallet that is elevated by a fork truck – there are proprietary pieces of equipment to provide safe access. If high level access is required close off aisles to create a safe working area, free from other traffic.

### Fire

Whilst it is not obvious, the air in Cold Stores is very dry. Wooden pallets and cardboard stored for some time become tinder dry and can quickly catch fire given a source of ignition. Maximum diligence is required on the safety of electrical wiring and equipment and of work involving heat is undertaken.

The site fire alarm system should alert people working inside the cold store of emergencies occurring outside. This may require sounders within the store.



### Lighting

General light levels for access purposes are recommended as 120 – 150 lux and at least double this if order-picking operations are required.

Emergency lights are important, sufficient number of battery powered fittings should be positioned in working areas and by exits to show escape routes in the event of power failure. Ensure the batteries and equipment can operate at the room temperatures.

### Housekeeping

This is particularly important as otherwise areas can become dangerous with spillage and/or rubbish accumulating to be a tripping hazard or entangling in truck wheels.

### Fork Lift Trucks

Manufacturer's or supplier's advice should be sought to make sure that trucks are suitable for work in cold temperatures. Where possible, trucks with enclosed cabs are preferred as these give protection to the operator without the need for PPE. It is advisable for battery-powered trucks to be retained in the cold store at all times. This reduces condensation and ice build up and prolongs battery life.

### Refrigerants

While all refrigerants are contained within a sealed system, leakage is possible for instance as a result of accidents with forklift trucks or pallet handling, seal failures etc.

Given the wide range of refrigerants now used, including ammonia, HCFC, HFC, hydrocarbons, liquid carbon dioxide, and nitrogen it is not practical in this guide to examine each in detail. Seek advice from your refrigeration engineers. Data is also available in the Codes of Practice mentioned at the end of this guidance paper.

In cases of leakage persons in the affected area should be evacuated and the area ventilated. Remember cold refrigerant gases sink to lower levels so areas below ground level, plant rooms, basements, stairwells etc may pose extra risk. However ambient temperature ammonia gas is lighter than air and so will rise.

**DO NOT ENTER WITHOUT APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND TRAINING.**

### Refrigeration Plant Rooms

Refrigeration plant rooms should be kept locked and secure against unauthorised entry. They should not be used for storage. The area should be well ventilated.

All equipment should be well maintained by competent refrigeration engineer(s). Copies of the Electric Shock poster and suitable fire precautions should be displayed.

**Personal Protective Equipment**

Protective clothing should protect the body core temperature and also the extremities. The degree of protection will depend on the temperature, “wind chill” caused by air movement and the physical effort involved in the work. A British standard provides advice on the appropriate level of PPE. The best protection is offered by several layers of clothing (this also gives flexibility of choice to workers). Clothing that becomes damp loses a lot of its insulation value so inner layers that wick sweat away from the skin are a good idea. Changing facilities that allow protective clothing to dry after use are needed.

Conventional steel-toed safety footwear may not be suitable as it provides little insulation for the feet.

Direct contact with cold surfaces can also cause damage. Contact with metal at temperatures below -7 degrees C can cause burns to the skin. Suitable insulated gloves or mitts are needed where workers handle frozen products or come into contact with cold surfaces.

According to the Cold Storage Association, the recommended protective clothing for temperatures below -5 Celsius includes:

- Thermal undergarments
- Jacket and salopettes or all in one coverall
- Cold store gloves with thermal liners
- Safety boots with thermal socks
- Safety helmet with thermal liner, thermal balaclava and thermal hood.

**Exposure Periods**

Measures to counteract the overall heat loss or peripheral cooling in the hands and feet may include limiting the length of time spent in the cold area. In temperatures below -25 Celsius, protective clothing can never provide complete protection and it is necessary to restrict the time of exposure and to allow time for the workers to re-warm themselves. There are no hard and fast rules but the table below is based on a German DIN standard.

**TABLE 1 EXPOSURE TO COLD AND RECOVERY PERIODS**

Air temperature °C	Maximum uninterrupted exposure to cold min.	Recommended recovery period as a percentage of cold exposure	Recommended recovery period min.
below – 5° to – 18	90	20	15
below – 18 to – 30	90	30	30
below – 30	60	100	60

Note Recommended recovery periods (column 4) has been rounded off using the percentages in column 3.

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## REFERENCES – FURTHER READING

HSE advice on workroom temperatures in places where food is handled.

HSE thermal comfort webpages

<http://www.hse.gov.uk/temperature/thermal/>

Heat stress in the workplace: what you need to know as an employer. HSE general information sheet No.1 <http://www.hse.gov.uk/pubns/geisl.pdf>

Health and Safety Laboratory Report No. PE0407

Health Effects of Working in Cold and Frozen Food Environments.

British Standard BS EN 378 parts 1- 4

Refrigeration Systems and heat pumps –  
Safety and environmental requirements.

British Standard BS 7915:1998

Ergonomics of the thermal environment –  
Guide to design and evaluation of working practices for  
cold indoor working environments.

Codes of Practice for Refrigeration

The Institute of Refrigeration, Kelvin House, 76 Mill Lane, Carshalton, Surrey, SM5 2JR  
publish a series covering most refrigerants

DIN Standard 33403-5

Climate at workplaces and their environments.

Ergonomic design of cold workplaces January 1997

## Noise at Work

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### THE CONTROL OF NOISE AT WORK REGULATIONS 2005

Loud noise is a problem in many sections of the meat industry. For example:

- In slaughterhouses common sources of noise include animals in lairage, powered saws, de-hairing machines, compressors for chillers and freezers.
- In other meat processing plants, other possible sources of noise include machinery such as bowl choppers, vacuum packing equipment and pie laminating equipment.
- In many smaller workplaces such as retail butchers it is unlikely that there will be a significant noise hazard.

As a rough guide, if people have to shout to make themselves heard at a distance of two metres, it is likely that there is a problem.

Regulations to protect workers hearing from exposure to loud noise were first introduced in 1989. Basically they required employers to take specific actions where average noise dose levels exceeded 85 deciBels (dB) and 90 dB. In 2005 new regulations were introduced with much tighter control levels. So many workplaces that were previously unaffected will now be covered by the regulations.

### NOISE AND HEARING LOSS

When the ear is exposed to noise above 80dB for more than a few minutes, the nerve endings in the inner ear become temporarily numbed and the hearing loses sensitivity. After a few hours away from the noise, the nerves return to normal and hearing is restored. Most people will have experienced this sensation after spending an evening in a noisy pub or a disco.

After prolonged exposure to such noise levels, the temporary damage becomes permanent. Once this permanent damage occurs the hearing will not recover.

As a result of damage to the nerve endings in the ear there are a number of symptoms:

- Difficulty in understanding what people are saying because damage occurs to the most sensitive part of the ear first.
- Difficulty in picking out what you want to hear against background noise.
- Sudden swings in the apparent noise level (called 'recruitment'). Recruitment distorts common sounds and makes it difficult to find a comfortable level for holding conversations, listening to the television, etc.
- The damaged nerves cause a ringing sensation in the ear called tinnitus. This can sound so loud it stops you from sleeping at night.

Once the noise level reaches 140dB, the pressure of the sound waves is so great that it can cause immediate permanent damage to hearing. That is why, in addition to the average noise doses the action values and exposure limit also include single peak sound pressures.

### CONTROL LEVEL

Under the 2005 regulations employers have a general duty to ensure that risk from noise is either eliminated or reduced. The regulations introduce two new 'action values' and an overall 'exposure limit'.

#### Lower Exposure Action Value

The first action value is a daily (8-hour) average noise dose of 80 dB, or a one-off peak sound level of 135 dB.

Where it is likely that this level will be exceeded, a detailed risk assessment is required. Personal hearing protection must be made available for employees who want to wear it.

#### Upper Exposure Action Value

The second action value is set at a daily (8-hour) average noise dose of 85 dB, or a peak sound level of 137 dB.

Where the upper action level is exceeded, employers must lower the noise level to the lowest level that is reasonably practicable, by means other than the use of hearing protection. If it is not possible to get the level down below the upper action level then the area must be marked as a hearing protection area and hearing protection must be worn.

In practice, many employers find it simpler to mark areas where the lower exposure action level is exceeded as hearing protection areas. This avoids any confusion over where wearing of hearing protection is compulsory or voluntary.

Employers must also ensure that no employee enters hearing protection zones without wearing personal ear protectors.

#### Exposure Limit Values

Whatever the noise level in the workplace, the employer must ensure that the actual exposure of workers does not exceed the exposure limit value. This is set at a daily (8-hour) average noise dose of 87dB or a peak sound pressure of 140 dB. When applying the exposure limit the use of personal hearing protection should be taken into account.

#### Weekly Noise Exposure

Where the exposure of an employee varies greatly from day to day, the employer may use a weekly (5 8-hour working days) noise exposure in place of the daily noise exposure when applying the action values and exposure limit. However the peak sound pressure levels remain the same.

### HEARING PROTECTION

Where ear protection is needed, employers must provide protection which is suitable - taking into account the noise levels involved, the type of work being done and the compatibility with other protective equipment such as hard hats as well as the fit to the wearer and any difficulty or discomfort experienced by the wearer.



*Pictogram for hearing protection zone sign*

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### INFORMATION, INSTRUCTION AND TRAINING

If any of the action levels are exceeded, the employer must provide employees with information and training which: -

- explains the risk of hearing damage
- explains the risk assessment the employer has carried out
- gives information about the noise reduction measures that have been introduced and about the exposure limit and action values
- explain how employees can obtain ear protection.

### MAINTENANCE AND EQUIPMENT

Personal ear protection and noise reduction equipment such as silencers must be regularly maintained and periodically checked.

Provision must be made for clean storage of re-usable personal ear protection. If special cleaning materials are needed they must be readily available.

### HEALTH SURVEILLANCE - AUDIOMETRY

Where employees are likely to be regularly exposed above the upper exposure action values, or are at risk for another reason, e.g. they already suffer from hearing loss or are particularly sensitive to damage, the employer must provide suitable health surveillance including testing of hearing. If the tests show hearing damage from the noise, the employer must ensure that the worker is examined by a doctor. They must also review their noise risk assessment and consider transferring the worker to other work which does not carry a risk of further noise exposure.

### EMPLOYEES' DUTIES

Employees must make full and proper use of personal hearing protection provided by their employer. They must co-operate with procedures the employer introduces to control the noise and must make themselves available, during working hours, for hearing tests.

They must take reasonable care of any noise reduction equipment or ear protection in their use and must report any defects or difficulties in using it.

### NOISE DOSE – HOW MUCH ARE WORKERS ACTUALLY EXPOSED TO?

The key factor in deciding when the Regulations apply is whether or not one of the action levels or the exposure limit is exceeded.

The action levels and exposure limit are usually based on noise doses averaged over 8 hours. Noisy machinery may be used intermittently during the working day or an individual worker may move around the workplace and may only work in the noisy area for part of the day. To calculate the actual noise dose workers receive in such cases, it is necessary to understand a little about how noise intensity or 'loudness' is measured.

### The Decibel Scale

Intensity	dB	Example of Noise Source
1	0	Quietest sound which can be heard
10	10	
100	20	Quiet Whisper
1,000	30	
10,000	40	
100,000	50	Normal Conversation
1,000,000	60	Busy Office
10,000,000	70	
100,000,000	80	Heavy Traffic
<b>Noise-induced deafness starts in this range</b>		
1,000,000,000	90	
10,000,000,000	100	Pneumatic Drill
100,000,000,000	110	
1,000,000,000,000	120	Rivet gun; shot-blasting
10,000,000,000,000	130	Extremely painful noise

Noise intensity is measured in decibels (dB). The range of intensity with which the human ear can cope is remarkable. Painfully loud noise, which causes immediate permanent hearing damage, is some 10 million, million times louder than the quietest sounds that can be heard. For this reason the dB scale is a "logarithmic" scale and is not a simple linear measure. The table above illustrates how it works and also gives some typical examples of noise levels.

As you can see from the chart an increase of 10 units on the dB scale is equal to a ten-fold increase in the intensity. This means that small changes in the deciBel level can actually involve quite large changes in intensity. This makes the deciBel scale confusing for people who are not used to it. A simple rule-of-thumb to remember when looking at noise surveys is: -

**An increase of 3 dB is equivalent to a doubling of the intensity**

**A decrease of 3 dB is equivalent to a halving of the intensity**

This means that 93 dB is twice as damaging as 90 dB so exposure to 93 dB for 4 hours is equivalent to exposure to 90 dB for 8 hours.

If, in an otherwise quiet workplace, a machine was used intermittently which gave off a fairly constant 91 dB when running, it would have to be used for 2 hours in total during the day for the upper action level (8 hour - 85 dB equivalent) to be exceeded. If this was likely, then steps would be required to reduce the noise of the machine or to provide hearing protection when it was running.

Similarly, if a worker spends part of the day in a quiet area and part in an area when the noise level is 83 dB, the lower action level (8 hour - 80 Db equivalent) would be exceeded if they spent 4 hours in total in the noisy area during an 8 hour day.

### FREQUENCY

Some more sophisticated measuring equipment will give information on the frequencies, which make up the noise as well as the loudness. Frequency is a measure of pitch not of intensity. The human ear is more sensitive to some frequencies than others and information on frequencies can also sometimes help to pinpoint sources of noise. Frequency analysis can help when deciding on appropriate protection or prioritising noise reduction measures. However, the limits in the Regulations are only concerned with loudness (regardless of the frequencies involved) and the time for which people are exposed to that loud noise.

### CONTROLLING NOISE AT WORK

There are three stages in the journey, which noise takes from its source to the human ear: the noise source, the noise path and the ear itself.

#### 1. The Noise Source

The best way to control noise is to reduce the level at source in the first place.

When new machinery is being bought to replace old noisy machinery, quieter machines should be bought where possible.

Existing equipment can often be modified (e.g. replacing metal gears and chains with plastic ones) to reduce noise levels.

Regular preventative maintenance will help to stop rattles and squeaks caused by wear and tear.

#### 2. The Pathways the Sound Travels Through the Air and the Building

Noisy equipment can often be isolated or enclosed. There may still be a risk for anyone who has to work inside the enclosure but at least the numbers at risk will have been reduced.

Much of the noise will not travel directly from the source to the ear but will be reflected off walls, floors, ceilings and other hard surfaces. Lining such surfaces with sound absorbing materials can sometimes give substantial reductions in the overall noise level.



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For example, noise levels from bowl-choppers can vary considerably and may often exceed 90dB when the machine is operating. New bowl choppers are commonly fitted with sound-insulating lids. Unfortunately, because of hygiene considerations it may be difficult to fit such lids to older machines already in use.

### 3. The person's ears

If engineering improvements to the equipment or the use of sound absorbing materials do not reduce the noise level sufficiently, the last resort is to use hearing protection to cut down the noise reaching the ear.

Both ear muffs and ear plugs can make a substantial reduction in noise levels provided they fit properly. However, they are often uncomfortable to wear and can cause sweat rash or other types of irritation to the sensitive skin in the ear. They can be difficult to fit properly and can quickly become worn or damaged.

The following factors are all essential when deciding on hearing protection: -

- careful selection of the most appropriate type;
- proper training and instruction on how to fit and wear it;
- close supervision to make sure that it is worn properly; and
- regular replacement of protectors that are worn, damaged or dirty.

Far from being a cheap and easy option, hearing protection can, therefore, be expensive. In any case, the Regulations make it clear that the provision of hearing protection is not a substitute for reasonable engineering solutions, which reduce the noise levels in the first place.

### EXAMPLES OF NOISE LEVELS IN THE MEAT INDUSTRY

There are several processes in the meat industry, which can cause high noise levels. There will be considerable variation in the noise levels in different workplaces depending on the size, layout and construction of the building, volume of work, etc. The examples simply serve to show the sort of noise levels that might be found. It is also necessary to consider the exposure time when calculating the noise dose. For example, exposure to animal noise of 95 dB for 15 minutes will exceed the lower action level (80 dB over 8 hours).

Lairage (animal noise)	80 dB - 110 dB
De-hairing Machines	80 dB - 95 dB
Electric Rotary Saws	Up to 100 dB
Cold Store and Chill Store Compressors	70 dB - 90dB
Vacuum Packing Machines	Up to 95 dB
<b>Large Slaughterhouse:</b>	
• Slaughterhouse Scald Area	82dB
• Slaughterhouse Washing Area	85dB
• Slaughterhouse Hide Puller	89dB
• Boning Room	84dB
• Cutting Room	75dB
• Chiller Rooms	82 dB – 92 dB
<b>Small Boning Plant:</b>	
• General Background	70 dB - 75dB
• Near Vacuum Pack Machine	90dB
• Box Chiller	65 dB - 70dB
• Refrigeration Plant Room	85 dB - 90dB

### FURTHER INFORMATION

**The Control of Noise at Work Regulations 2005.** Guidance on Regulations L108, HSE Books, 2005 £13.95.

**Noise at Work – Guidance to employers on the Control of Noise at Work Regulations 2005,** INDG362 (rev1), HSE Books, 2005. Free for single copies.

**Reducing Noise Exposure in the Food and Drink Industries,** HSE Food Information Sheet No. 32, 2002 (predates 2005 regulations), <http://www.hse.gov.uk/pubns/fis32.pdf>

**Sound solutions for the food and drink industries: Reducing noise in food and drink manufacturing,** HSG 232, HSE Books, 2002. £15.95 (predates 2005 regulations).

**HSE web pages on noise** - <http://www.hse.gov.uk/noise/index.htm>

## Personal Protective Equipment (PPE) in the Meat Industry

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### INTRODUCTION

This guidance gives advice on personal protective equipment (PPE) for the meat industry and is relevant to slaughtering and processing plants and butchers in retail shops. It is not possible to cover in this Guidance Note all the PPE issues that are relevant to the meat industry, and therefore it is recommended that HSE guidance is used to help duty holders decide on what action they need to take. For example, [leaflet INDG174\(rev1\) entitled “A short guide to the Personal Protective Equipment at Work Regulations 1992”](#), is available free from the HSE website and includes helpful summaries of;

- What is PPE\*
- What the Regulations require
- Assessing suitable PPE
- Health and safety hazards and appropriate types of PPE
- Training for users
- Maintenance
- CE marking

The full regulations and more comprehensive guidance are contained within “The Personal Protective Equipment at Work Regulations 1992. Guidance on Regulations” reference L25 - available from HSE Books [and from the HSE website](#). See the section on references at the end of this Guidance Note for more information.

*\*Note: The term ‘PPE’ is often used generally within the food industry to describe all clothing equipment worn during food manufacture e.g. hairnets, beard snoods, gloves, overalls, etc. This Guidance Note is specific to Personal Protective Equipment as defined in the PPE at Work Regulations 1992. This definition includes all equipment which is intended to be worn by a person at work and which provides protection against one or more risks to health or safety.*

This guidance is intended for workers in slaughtering and meat processing plants, but the advice is also relevant for butchery tasks. Suitable controls, including the use of PPE should be implemented as part of the risk assessment process. In retail butchery, where the work is generally carried out at a slower pace and experienced butchers may have very good knife skills, the level of risk may be less than in an industrial environment. Thus it is acceptable practice for retail butchers undertaking work such as light trimming and cutting to be carried out safely in the front shop without industrial PPE, but for back shop boning operations where more force is used and/or the knife is drawn towards the body full chain mail glove, arm guard and apron should be worn.

### THE MAIN LEGISLATIVE REQUIREMENTS

[The Health and Safety at Work Act 1974 \(HSW\)](#) - requires employers and the self employed to take reasonable precautions to protect the health and safety of themselves, their employees and others who might be affected by their work activities.

[The Management of Health and Safety at Work Regulations 1999](#) - require employers and the self employed to assess risks to health and safety in order to identify the means of reducing risks to an acceptable level.

When deciding what control measures to take the law requires duty holders to apply the hierarchy of control measures, and this implies that PPE should always be regarded as a last resort to protect against health or safety risks. Elimination of the hazard, substitution with a safer alternative, engineering controls and safe systems of work should always be considered first. However, PPE is a practical solution to many risks associated with the industry and is often used in conjunction with other control measures.

The [Personal Protective Equipment at Work Regulations 1992](#) requires that suitable PPE is supplied and used at work wherever there are risks to health and safety that cannot be adequately controlled in other ways. These Regulations also require that PPE is:

- properly assessed before use to ensure it is suitable
- fitted properly on the wearer
- maintained in working order
- stored in suitable accommodation
- used by employees in accordance with instructions
- compatible with other items of PPE worn
- effective without increasing overall risk

Employers are also required to provide their staff with information, instruction and training on the use of PPE.

The “PPE at Work Regulations 1992” place an obligation on employers to select “suitable” equipment to protect their employees. These regulations do not apply where other regulations specifically require the provision and use of PPE, for example:

[The Control of Lead at Work Regulations 2002.](#)

[The Ionising Radiations Regulations 1999.](#)

[The Control of Asbestos Regulations 2006.](#)

[The Control of Substances Hazardous to Health Regulations 2002 \(as amended\).](#)

[The Noise Regulations 2005.](#)

[The Construction \(Head Protection\) Regulations 1989.](#)

### **FIT FOR PURPOSE**

You should ensure that any PPE provided is ‘CE’ marked and that it complies with the requirements of the [The Personal Protective Equipment at Work Regulations 1992](#). The CE marking signifies that the PPE satisfies certain basic safety requirements and in some cases it will have been tested and certified by an independent body. This helps to ensure that the equipment is fit for purpose and suitable to reduce the risks. Only then can a manufacturer display the CE mark on the product. Nuisance dust masks are not protective devices: are not classified as PPE, and are not CE marked.

### PRACTICAL GUIDANCE ON SELECTION

The huge range of PPE available can be confusing and potentially misleading. Always check for a CE mark described above. If you are in doubt about selection of correct PPE contact your supplier or the manufacture for advice. Implementing the wearing of PPE may involve a culture change within the workforce and employees should be consulted about PPE which they may be required to wear. Obtaining different samples of the same type of PPE (e.g. from different manufacturers) and getting feedback from potential users will help to ensure that the selected PPE is more readily accepted and used.

### TYPES OF PPE USED IN THE MEAT INDUSTRY

#### Eye and Face Protection

The main types of eye and face protection are safety spectacles, goggles and face shields.

Safety spectacles can be fitted with prescription lenses if required, but only offer protection to the eyes against certain types of hazard. When liquids or dust are the hazard, goggles (of which there are several categories), or a face shield will usually be required. Goggles give the eyes protection from all angles as the complete rim is in contact with the face. Face shields protect the face and most types can be worn over prescription glasses. Hazards that require eye and face protection include liquid or chemical splash including biological agents and contaminants, working with cleaning chemicals and vapour or liquid mist and particles from high pressure cleaning tools or some types of powered cutting equipment eg hand-held circular saws.

#### Hand Protection

Gloves of various designs can provide protection against a wide range of hazards including cuts, abrasions and stabs, extremes of temperature, skin irritation and dermatitis, contact with chemicals and other hazardous substances including biological hazards. There are four types of hand and arm protection including gloves (for the hand only), gloves with a cuff (for hand and wrist), gauntlet (for hand, wrist and part of forearm) and sleeving or arm protection. Care should be taken in the donning, use and removal of gloves to prevent contamination of the hands. Make sure that users are not allergic to or sensitized by the material from which the glove is made (eg if you have to use latex gloves use a powder free type or preferably use an alternative material to latex where possible). Gloves come in a range of sizes and care should be taken to select the right size for the individual.

#### Protection Against Cuts and Stabs

Knife accidents are very common in the meat industry, usually involving cuts or stabs to the non-knife hand, forearm or body. The best protection will normally be achieved by the use of chain mail. Cut-resistant material used for PPE such as gloves is not a substitute for chain mail but it may be used in circumstances where chain mail is not reasonably practicable and can be justified by risk assessment.

For example, in the slaughter hall, operatives may use chain mail to protect the non knife hand and use cut-resistant material on the knife hand. For some tasks eg where it is necessary for the operative to use a knife with either hand, cut-resistant material may be used. Chain mail should be worn on the non knife hand during de-boning work. It should be noted that cut-resistant gloves may require periodic inspection and replacement since their durability may decline as a consequence of frequent washing at high temperatures.

### Hearing Protection

The [Noise Regulations 2005](#) specify that employers have to provide their employees with hearing protection if they ask for it, and their noise exposure is between the lower and upper exposure action values specified in the regulations (eg. between 80 and 85 decibels for daily exposure). Remember you should not use hearing protection as an alternative to controlling noise by other methods. Select equipment that is suitable for the working environment. Under attenuation will not provide the correct level of protection where over attenuation can make communication difficult, mask warnings and helpful sounds and can also make the user feel isolated. Earmuffs incorporate hard plastic cups which fit over and surround the ears should fit tightly with no gaps around the seals. Earplugs which fit into or cover the ear canal to form a seal can be difficult to fit properly and may be disposable or re-usable. Hearing protection zones (above 85 decibels daily exposure) make the wearing of protection mandatory.

### Protective Footwear

The safety boot or shoe is the most common type of safety footwear. They normally have steel toe caps, but may also have other safety features including slip resistant “anti-slip” soles that can reduce the likelihood of slipping on certain floors, steel midsoles and insulation. Wellington boots, usually made of rubber protect against water and wet conditions and are suitable for washing and disinfection to maintain hygienic conditions. They may also have safety features (eg steel toe caps). A key point to consider is comfort for the wearer eg cushioned soles make standing more comfortable.

The main hazards which may need consideration in the working environment are objects falling on and crushing the feet or toes, treading on slippery surfaces eg floors, working in cold conditions, working with hazardous chemicals and in environments that are wet or contaminated.

### Protective Aprons

Butchers and slaughterhouse workers should wear plate link or preferably chain mail aprons if there is a risk of injury to the abdomen or chest, for example using knives or choppers in de-boning work or other work where the knife is pulled with the point towards the body.

Aprons should be sufficiently long enough to provide adequate protection depending on the nature of the work eg usually covering the body area from mid breast bone to mid thigh. The weight of the apron should be borne by the wearer’s shoulders and not the neck, and be adjustable so it sits neatly against the body without sagging. For certain operations, a tunic covering the shoulders and upper torso may be required eg reaching upwards to work on hanging meat in pre trimming or using pullers/liberators.

### Head Protection

There are several types of head protection available including industrial safety helmets or “hard hats” which protect against falling objects or impact with fixed objects, and bump caps which protect against bumping the head (eg walking into a fixed object). Bump caps do not offer adequate protection where there is a risk of falling objects or moving or suspended loads.

The key points to note are to use an adjustable chinstrap, if fitted to ensure the helmet does not fall off, to check regularly for damage and to replace it after significant impact. The helmet should be worn properly – do not wear it back to front as protection will be greatly reduced.

### Respiratory Protection

RPE is designed to protect the wearer against inhalation of hazardous substances in the workplace air. Respirators (filtering devices) use filters to remove contaminants in the air and are available with a range of different face pieces. Masks and other tight fitting face pieces (e.g. disposable masks, half and full face masks) rely on having a good seal with the wearer's face in order to be effective, whilst loose fitting face pieces (e.g. hoods, ventilated visors and helmets) rely on clean air being provided to the wearer by a fan to prevent contamination leaking in. Wearers of tight fitting face pieces should undergo face piece fit testing to ensure the selected item fits the wearer correctly. Facial hair such as beards or stubble will prevent a good seal from being achieved. If in doubt speak to the supplier or manufacturer. There may also be situations in which breathing apparatus (BA) may be required. For more detail on the selection of appropriate respiratory protection (including BA) see HSE [guidance HSG53](#).

### Personal Fall Protection

This equipment comprises an assembly of components for protection against falls from height. Work-restraint systems prevent the user from reaching areas where the risk of a fall exists and in practice will include a body holding device such as a lanyard connected to a suitable anchorage point. Full discussion of the merits of each type of fall protection device are outside the scope of this guidance note, but will be covered in future guidance on preventing falls.

### Thermal Protection

Many workers in the meat industry work in temperature controlled areas. Regulation requires temperature in fresh meat preparation rooms to be kept below 12 degrees Celsius. In practice to maintain product quality temperatures of 5 degrees Celsius or lower are common. In addition some staff will spend long periods inside chillers or freezers where temperatures may be kept well below zero. (See also [BMPA Guidance Note GN 1-28](#) on Thermal Comfort) Protective clothing and gloves play an important part in protecting the health, safety and welfare of workers at such temperatures.

The best option is usually to provide several light layers rather than one thick coat or jacket. This gives better insulation because the air is trapped in different layers. It also allows more flexibility to allow someone who feels too hot to remove a layer. And it is less likely to interfere with the work or the wearing of other PPE like chain mail aprons because it will not be so bulky.

The innermost layer should ideally be made of a material that can wick moisture away from the body so that sweat does not build up. When wet many fabrics lose a lot of their insulation so sweating can reduce the effectiveness of the clothing. Particular attention should also be paid to keeping the head, hands and feet warm by the provision of thermal hats, gloves and boots or socks.

Selection of thermal protection must also take account of food hygiene requirements. In many workplaces, appropriate thermal protection will be required and it will be important to make sure it is suitable to be worn under the outer layer designed to protect the meat product from contamination.

Examples of the protective clothing that would be suitable for work in chilled areas down to minus 5 Celsius and in freezers may be found in [HSE publication HSG76 – Warehousing and Storage - a guide to health and safety](#).

### INFORMATION, INSTRUCTION AND TRAINING FOR EMPLOYEES

PPE is only effective if it is used correctly and properly maintained. The law requires employers to provide suitable and sufficient information, instruction, training and supervision to help employees meet these requirements.

Employees should be provided with sufficient information, instruction and training to enable them to know:

- the risks which the PPE will avoid or limit;
- how the PPE is to be used;
- action to be taken to ensure it remains effective;
- how to report loss or defects

Training should include theory as well as practice, and in accordance with manufacturer's instructions. The extent of the training will vary with the complexity of the equipment, and the needs of the people being trained. Refresher training may be needed from time to time.

Employers must ensure that the information and instructions that they provide for their staff are comprehensible, particularly with a non English speaking/multi-national workforce. Measures should be in place to check that staff understand what they are being taught. Signs can be used to clearly indicate areas in which wearing of PPE is mandatory and the types of PPE required.

### TEMPORARY STAFF AND CONTRACTORS

In some businesses, particularly where peripatetic workers (such as contract workers or temporary staff) are employed, the site operator will be better placed to provide the appropriate PPE than the peripatetic worker's employer. Although under these circumstances the employer does not have to repeat the provision of PPE, it is still the employer's responsibility to ensure that suitable PPE is provided by the site operator. Likewise, the site operator may in practice take further action necessary to meet the requirements of the PPE Regulations, but the employer still remains responsible for ensuring that this has been done. Therefore, cooperation and good communication between the parties is essential.

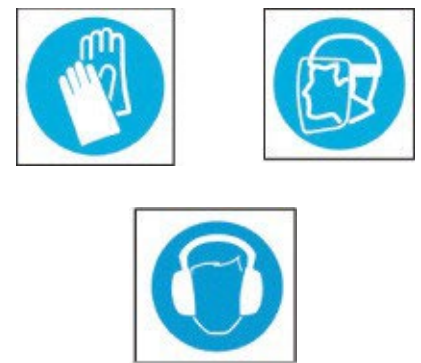


Diagram 2 – Examples of signs indicating that appropriate PPE must be worn.



Whether PPE can be shared will depend upon the particular circumstances. At the two extremes, a full-time worker should be provided with their own personal PPE, whereas an agency worker doing a one-off shift would be expected to share PPE which has been hygienically cleaned. Intermediate cases should be treated on their merits but, ensuring in all cases that PPE provided is hygienic and does not present a health issue. For example, if boots are shared, sanitised liners or socks can be provided by the agency or user business.

**Practical examples:**

(i) A food business needs to recruit a number of additional temporary staff during a busy period. These workers are to be supplied by a local labour provider or agency. The food business provides these temporary staff with the necessary PPE to the same standard as that provided for their own full time employees. This arrangement is discussed and agreed between the food business and the labour provider before the work starts.

(ii) A food business needs to utilise a specialist contractor to carry out building and maintenance works. These specialist workers require PPE not normally available or used by the employees of the food business when carrying out their normal work activities. In this case it is more appropriate that the food business and the contractor agree in advance of the works that the contractor will provide the necessary PPE for his own staff to use whilst on the food business site. When checking to ascertain the competency of a contractor to carry out work it would be reasonable to check what PPE will be provided.

**Remember:**

- By virtue of the HSW Act 1974, employers cannot impose a charge on workers for the provision of PPE which is used only at work.
- The wearing of PPE by workers should be monitored by supervisors or managers to ensure staff continue to use it as instructed. Appropriate action should be taken in cases where PPE is not being worn (eg refresher training).
- PPE selected must be suitable for the working environment and compatible with any other PPE that needs to be worn.

### APPENDIX 1

A selection of the typical activities or tasks, hazards and risks likely to be encountered and an indication of the relevant PPE required.

Note: The choice of suitable PPE for any task should be determined by carrying out a specific risk assessment in order to determine the exact requirements. The tables are intended to be a general guide only and may not cover all tasks or situations.

**BEEF SLAUGHTER AND BONING**

**POTENTIAL HAZARDS/RISKS REQUIRING PPE**

TASK	Kicks and attacks	Cuts	Falling objects	Falls	Slips	Temperature	Biological	Particulate/spray	Chemical	Vehicle	Weather	PPE required
Drover	✓				✓		✓				✓	BCDFM
Stunning	✓				✓		✓	✓				BCDEFL*M
Sticking	✓	✓	✓		✓		✓					BCDEFIJKMAH
Head skinning		✓	✓		✓		✓					ABCDFIKMH
1st & 2nd leg		✓	✓	✓	✓		✓					ABCDFIKMOP
Change over			✓	✓	✓		✓					ABCDFIKMO
Butts		✓	✓	✓	✓		✓					ABCDFIKMO
Bungs			✓	✓	✓		✓					ABCDFIKMO
Fronting		✓	✓		✓		✓					ABCDFIKM
Head removal		✓	✓		✓		✓					ABCDFIKMH
Hypothalamus		✓	✓		✓		✓					BCDFIKL*M
Splitting		✓	✓	✓	✓		✓	✓				BCDFHIKL*MO
Opening		✓	✓	✓	✓		✓					ABCDFHIKMO
Offal removal		✓	✓		✓		✓					BCDFIKM
Back fat trim		✓	✓		✓		✓					BCDFIKMH
Offal inspection		✓	✓		✓		✓					BCDFIKMH
Offal trim		✓	✓		✓		✓					BCDFIKMH
Head boners		✓	✓		✓		✓					BCDFIKNH
Carcass inspection		✓	✓		✓		✓					BCDFIKNH
Spinal cord removal		✓	✓		✓		✓					BCDFIKL*NH
Carcass trim (dirt)		✓	✓		✓		✓					BCDFIKNH
High level trim		✓	✓	✓	✓		✓					BCDFIKNOH
End of line trim		✓	✓	✓	✓		✓					BCDFIKNOH
Carcass trim (F/Q)		✓	✓		✓		✓					BCDFIKNH
Meat porter (scales)		✓	✓		✓		✓					BCDFKN
Gut room		✓			✓		✓					BCDFIHNN
Offal room		✓			✓		✓					BCDFILL*NHA
Hygiene			✓		✓			✓	✓			ABCDFJKN
Vertical boning		✓			✓							BCDGHINH
Table boning		✓			✓							BCDGHINH
Bandsaw		✓			✓			✓				BCDIJN
Trimming		✓			✓							BCDHINH
Yard areas					✓					✓	✓	BCDFM
Chills & Freezers			✓		✓	✓				✓		QBK

**KEY: Types of PPE required**

- |  |   |
|--|---|
| A Impervious gloves / gauntlets                  | J Eye protection                                |
| B Steel toe capped boots                         | K Hard hat                                      |
| C Impervious boots                               | L Face / mouth protection L* = OTM              |
| D Overalls laundered daily                       | M Deep tread sole pattern – gross debris        |
| E Hearing protection                             | N Finer tread sole pattern - fine debris        |
| F Impervious leggings / suit / apron             | O Fall prevention                               |
| G Chain mail apron                               | P Chain mail - Abdomen and upper leg protection |
| H Chain mail glove(s) / arm guard(s) / sleeve(s) | Q Thermal Protection                            |
| I Cut resistant glove(s)                         |   |

PIGS

POTENTIAL HAZARDS/RISKS REQUIRING PPE

TASK	Kicks and attacks	Cuts	Falling objects	Falls	Slips	Temperature	Biological	Particulate/spray	Chemical	Vehicle	Weather	APPENDIX 2
Drover	✓				✓		✓				✓	BCDFM
Stunning	✓				✓		✓	✓				BCDFM
Sticking	✓	✓	✓		✓	✓	✓					BCDEFIJKM
Pre wash*		✓	✓	✓	✓	✓	✓	✓				BCDEFJKNO
Scald*		✓	✓	✓	✓	✓	✓	✓				BCDEFJKNO
Dehairing*		✓	✓	✓	✓	✓	✓	✓				BCDEFJKNO
Polish*		✓	✓	✓	✓	✓	✓	✓				BCDEFJKNO
Evisceration		✓	✓	✓	✓		✓					ABCDEFGHIKM
Offal inspection		✓	✓		✓	✓	✓					ABCDEFGHIKM
Pluck removal		✓	✓	✓	✓		✓	✓				ABCDEFGHIKM
Splitting Carcase		✓	✓	✓	✓	✓	✓	✓				BCDEFJKMO
Carcass inspection			✓		✓	✓	✓					BCDEFIKN
Loosen heads		✓	✓	✓	✓		✓					ABCDEFGHIKM
Gland removal		✓	✓	✓	✓		✓					ABCDEFGHIKM
Spinal cord, flare fat kidney removal		✓	✓	✓	✓		✓					ABCDEFGHIKM
Weigh carcase		✓	✓	✓	✓		✓					BCDEFK
Chills & Freezers						✓				✓		Q
Breaking down primals using machinery. I.e. Band saw		✓	✓	✓	✓		✓	✓				ABCD FG IK MJ
Trimming		✓	✓	✓	✓		✓					ABCD FG IK M
Stringing/netting		✓	✓	✓	✓		✓					BCDFKM
Bagging		✓	✓	✓	✓		✓					BCDFKM
Vac pack/ CVP operation		✓	✓	✓	✓		✓					BCDFKM
Metal detection			✓	✓	✓							BCDFKM
Weigh, label and date code		✓	✓									BCDFKM
Yard areas										✓	✓	ABCD FM

KEY: Types of PPE required

- A Impervious gloves / gauntlets
- B Steel toe capped boots
- C Impervious boots
- D Overalls laundered daily
- E Hearing Protection
- F Impervious leggings / suit / apron
- G Chain mail apron
- H Chain mail glove(s) / arm guard(s) / sleeve(s)
- I Cut resistant glove(s)
- J Eye protection
- K Hard hat
- L Face / mouth protection
- M Deep tread sole pattern – gross debris
- N Finer tread sole pattern - fine debris
- O Fall prevention
- P Chain mail - Abdomen and upper leg protection
- Q Thermal Protection

Tasks marked with \* may be undertaken automatically with no employee involvement

## SHEEP

## POTENTIAL HAZARDS/RISKS REQUIRING PPE (Table revised August 2013)

TASK	Kicks and attacks	Cuts	Falling objects	Falls	Slips	Biological/zoonoses	APPENDIX 2
Lairage	✓				✓	✓	A
Fleece trim					✓	✓	A
Stun					✓	✓	A B
Shackle					✓	✓	A B
Stick		✓			✓	✓	A B C E G
Shear		✓			✓	✓	A B E
De-head		✓		✓	✓	✓	A B C D G
Breast strip & tail removal		✓		✓	✓	✓	A B C D E
Legging		✓		✓	✓	✓	A B E
Socks		✓		✓	✓	✓	A B E
Y cut		✓		✓	✓	✓	A B E
Breast roller				✓	✓	✓	A B
Inversion				✓	✓	✓	A B
Hind feet		✓		✓	✓	✓	A B C D E
Punch				✓	✓	✓	A B
Rodding				✓	✓	✓	A B
Pelt puller				✓	✓	✓	A B
Gambrel re-invert				✓	✓	✓	A B
Front feet		✓		✓	✓	✓	A B C D E
Anus and belly split		✓		✓	✓	✓	A B C D E
Throat removal		✓		✓	✓	✓	A B C D E
Throat trim		✓		✓	✓	✓	A B C D E
Pluck removal		✓		✓	✓	✓	A B C D E
Gut removal				✓	✓	✓	A B
Offal trim		✓		✓	✓	✓	A B C D E
QC trim		✓		✓	✓	✓	A B C D E
Splitting saw				✓	✓	✓	A B
Inspection		✓			✓	✓	A B C E
Transfer to star carriers			✓		✓	✓	A B H
Chiller ops			✓		✓	✓	A B H
Pre-inspection		✓			✓	✓	A B C D E F
Breast tying		✓			✓	✓	A B C D E F
Liver trimming		✓			✓	✓	A B C D E F
Boning, cutting and trimming		✓			✓	✓	A B C D E F
Scribe saws		✓			✓	✓	A B C E
Band saws		✓	✓		✓	✓	A B H
Circular knife		✓	✓		✓	✓	A B E H

## KEY: Types of PPE required

- |   |   |   |                                  |
|---|---|---|----------------------------------|
| A | Toe tec, anti-slip wellington/ear protection/impervious gloves/overalls | E | Cut resistant glove/s            |
| B | Impervious bib and brace leggings or apron                              | F | Chain mail tunic                 |
| C | Chain mail glove  | G | Chain mail split leg or leggings |
| D | Chain mail long arm   | H | Hard hats                        |

**Notes (for all tables):**

Consideration should be given to the wearing of impervious gloves under chainmail gloves as experience has shown that chain link can cause minor nips to the skin. Once open these cuts are then liable to infection so the wearing of impervious gloves will reduce the risk.

- E Hearing protection depends on the noise levels, eg generally required in slaughter hall
- H Certain tasks may require chain mail protection to the non-knife hand/arm and cut resistant protection for the knife hand – see section on protection against cuts and stabs.
- Q Thermal protection (protection against the cold) is appropriate for work in freezers and cold environments

High visibility clothing may be appropriate for yard workers to make the wearer easier to see in daylight and under illumination eg by vehicle drivers.

**REFERENCES AND USEFUL CONTACTS**

**Health and Safety Executive**

HSE Infoline: telephone 0845 3450055 or see [www.hse.gov.uk](http://www.hse.gov.uk)

HSE Books: telephone 01787 881165 or see <http://books.hse.gov.uk/hse/public/home.jsf>

Note that many publications are now available to download free of charge from the HSE website.

**HSE Publications:**

- [Personal Protective Equipment at Work Regulations 1992: Guidance on Regulations \(second edition\) - reference L25 - HSE Books 2005](#)
- [A short guide to the Personal Protective Equipment at Work Regulations 1992 – reference INDG174](#)
- [Respiratory Protective Equipment at work – a practical guide – reference HSG53](#)
- [Protect your hearing or lose it! – Pocket cards – reference INDG363](#)
- [Controlling Noise at Work – Guidance on Regulations – reference LI08](#)

**British Standards Institution:** BSI British Standards, Customer Services

389 Chiswick High Road, London W4 4AL

Telephone: 020 8996 9001 or see <http://shop.bsigroup.com/>

Personal Protective Equipment - examples	Standards
Protective clothing – protection against cuts and stabs by hand knives	
Part 1: Chain mail gloves and arm guards	BSEN 1082-1:1997
Part 2: Gloves and arm guards (non chain mail)	BSEN 1082-2:2000
Protective clothing - gloves and arm guards protecting against cuts by powered knives	BSEN 14328:2005
Protective clothing – aprons, trousers and vests protecting against cuts and stabs by hand knives	BSEN ISO 13998:2003

## Work at Height within the Meat Industry (Revised January 2014)

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### INTRODUCTION

The [work at Height Regulations 2005](#) came into force on 6 April 2005. The Regulations apply to all work at height where there is a risk of a fall liable to cause personal injury. The regulations place duties on employers, the self-employed, and any person that controls the work of others (for example facilities managers or building owners who may contract others to work at height). There is an HSE guidance note under these regulations <http://www.hse.gov.uk/pubns/indg401.pdf> INDG401 “The Work at Height Regulations 2005 (as amended) a brief guide”. However there are some common tasks and hazards within the Meat Industry. This guidance note identifies these and offers advice to manage the risks and comply with the regulations.

These regulations have been made to prevent the deaths and injuries caused each year by falls at work. They replace all the earlier regulations about working at height.

### IN ABATTOIRS, SLAUGHTERHOUSES AND MEAT PROCESSING FACTORIES, TASKS UNDER THE WORK AT HEIGHT REGULATIONS INCLUDE:

- Carcase work
- Knife & butchery work
- Inspection & splitting
- Access to tanks e.g. tallow tanks, blood tanks etc.
- Maintenance/contract work including portable ladders, MEWPS, scissor lifts and cherry pickers
- Cleaning activities, minor roof work,
- Accessing road tankers and other vehicles

### IN RETAIL

- There may be fixed steps and platforms but generally work at height will be maintenance and particularly using portable ladders and steps, e.g. changing lights, cleaning and building maintenance

The risk for most of these activities in both wholesale and retail can of course be increased with water, ice, grease, fat and blood which may be present either on step/platform surfaces or on the surface a ladder or step is placed upon.

As part of the regulations, duty holders **must** ensure:

- all work at height is properly planned and organised; those involved in work at height are competent;
- the risks from work at height are assessed and appropriate work equipment is selected and used;
- the risks from fragile surfaces are properly controlled; and
- equipment for work at height is properly inspected and maintained

There is a simple hierarchy for managing work at height and selecting equipment for work at height. Duty holders **must**:

- avoid work at height where they can;
- use work equipment or other measures to prevent falls where they cannot avoid working at height; and
- where they cannot eliminate the risk of a fall, use work equipment or other measures to minimise the distance and consequences of a fall should one occur

### **POLICY**

The Company health and safety policy should include work at height, setting out objectives and implementation of controls to manage these activities.

### **RISK ASSESSMENT**

All tasks involving work at height should be identified and a suitable and sufficient assessment of risk must be made. Note previous regulations defined work at height by a specific distance off the ground, but under the current regulations, work at any height off the ground must be considered. If significant hazard potential is identified then controls must be implemented.

### **PROCEDURES, PERMITS AND METHOD STATEMENTS**

If the work at height is part of regular work e.g. in slaughter, production or a daily occurrence and the risk is not high then there should be a written safe working procedure. Higher risk and usually less frequent work at height tasks should be controlled by a permit to work system. For one off jobs, for example contractors undertaking roofing work there should also be a method statement.

### **APPLYING THE HIERARCHY TO THE RISKS**

#### **Fixed Steps and Ladders**

If the need for these cannot be eliminated then the design should be as safe as possible. In addition to standard requirements of hand rails, hand holds etc. Consideration should be given to fat, grease and other fluids that may accumulate on these steps. If this is the case, steps should be used if possible rather than vertical ladders and anti slip step/rung nosings should be fitted. <http://www.hse.gov.uk/pubns/indg402.pdf>

#### **Fixed Work Platforms**

If fixed platforms cannot be eliminated these must be fitted with a back rail, and if there is a fall risk with significant hazard, also a front rail at 910 mm, with gaps no more than 470mm, and a toe board. Where this cannot be fitted, because for example, working down the carcass in production then personal fall protection equipment (eg work restraint, work positioning or fall arrest), must be worn. Platform surfaces must be of anti slip grating or treated with anti slip material. There should also be a means of closing the rail opening at the top of the steps. A chain is often provided, but these are seldom used. A better solution is a solid bar which falls back into the horizontal position after opening.

### Rise and Fall Platforms

To prevent falls from height the options are the same as for fixed platforms. Back front and side rails must be fitted complete with toe boards. Where it is not practical to fit front rails either a 'harness and lanyard' or a 'fall arrest system' must be provided and used by the operator. If there is a significant risk of the platform failing then a fall arrest system should be securely anchored to the steel work above the platform. However, if the design and operation permits it, the toe board and rail option is a much better solution as it enables the operator to move without restriction. An example of this is the splitting saw platform where the operator has to lean forward to enable the saw to cut the lower section of the carcass. Platforms may fail for a number of reasons but often it is due to a compressed air or a hydraulic fluid leak. Automatic check or blocking valves should be fitted to cylinders and tested regularly as part of a preventative maintenance schedule. It should be noted that some manufacturers have only recently started to fit check or blocking valves so the site engineer must carry out a risk assessment and see if they are fitted, particularly on older machines.

In addition to checking the air or hydraulic systems it is also important to ensure all mechanical parts of the lifting system, cylinders, rods, anchor points, locking nuts and locking pins, etc. are correctly installed and in good condition. These must also be checked and replaced as part of the preventative maintenance schedule.

As with any moving machinery it is important that personnel are excluded from the area of operation. Rise and fall platforms can drop without warning due to normal operation or due to a fault so it is essential that access to the area below the platform is restricted. If possible the area should be fenced to restrict access or "trip bars" can be fitted to the underside. If trip bars are chosen as a solution the associated control system must operate as part of a "failsafe" system and a specialist engineer should be consulted to ensure safe operation.

Rise and fall platforms being passenger lifts must also be inspected every six months under LOLER, (the Lifting Operations and Lifting Equipment Regulations 1998).

### Access to Tanks e.g. Tallow Tanks, Blood Tanks etc.

The need to access tanks should be eliminated or at least reduced by installing monitoring equipment that can be accessed at ground level. Portable ladders should not be used, but fixed steps or ladders should be provided. As with all fixed access for work at height, fixed steps with hand rails should be chosen rather than fixed ladders, if possible. If fixed ladders have to be used then these must be fitted with back hoops and hand holds at the top. Rungs and surfaces should have anti slip surfaces.



### Road Tankers

Access should never be attempted with portable equipment. The need to access road tankers should be eliminated where possible. If there is an absolute need to access road tankers the first choice should be a fixed platform and stair with rails and toe boards. The tanker parks under the platform and the tanker caps are then accessed through a 'trap door' in the platform. If this cannot be provided then the tanker must be fitted with a ladder, platform and hand rail. Although some tankers are fitted with a rail on both sides of the platform most only have one rail. When there is only one rail personal fall protection equipment should also be used. Other types of vehicle that require regular access should also have ladders and platforms fitted.

[HSE - Falls - Case studies - Falls from tank containers](#)

### Maintenance/Contract:

All maintenance and contract work at height must be eliminated wherever possible particularly when outside contractors are used because controlling contractors will always be more difficult than people who are directly employed. The next choice would be fixed permanent steps and catwalks internally and fixed anchor points, edge guarding on roofs. If access is required across laminated panel ceilings catwalks must be fitted if regular access is required, but one off jobs may be carried out using crawling boards subject to the condition of the panels and an assessment of risk. Contractors should be on permit to work and must provide method statements. The hierarchy for selecting portable equipment if it has to be used is:

1. Scissor lifts or cherry pickers <http://www.hse.gov.uk/falls/mewps.htm> these must be examined by a competent person, Personal fall protection equipment must be used and operators must be trained
2. Scaffold towers, which also must be examined, erected by a trained competent person and again personal fall protection equipment must also be worn
3. Portable ladders and step ladders must be registered and examined. Ladders should only be used for low risk work of short duration where a safer alternative is not practical. Users must be trained in the safe use of ladders. Ladders should also be footed, but a better option is to have some form of fixed clip at points where access is required which will secure the ladder.

### Insulation Panel Maintenance

There have been a number of accidents in industry we would strongly guide users to <http://www.hse.gov.uk/safetybulletins/coldstoreceilings.htm> Implementation could save life.

### Cleaning Activities

The hierarchy for access equipment is the same as for maintenance and contractors; however there may be more options for eliminating the need to work at height. For example long arm hoses and attachments that can be used from the ground.

### In Retail

There may be fixed steps and platforms for example to access refrigeration equipment, but generally work at height will be for changing lights, cleaning and maintenance using portable ladders and steps etc. The requirements for fixed equipment is as above. Where portable equipment is used it must be registered and inspected. Again all those using portables must be trained in the safe use of ladders.

### Note

**If personal fall protection equipment consisting of a harness and lanyard is used for any work at height there must be an emergency rescue plan.**

**Personal fall protection equipment including, harnesses, and lanyards must be inspected before use and at regular intervals by a competent person.**

### SUMMARY OF STEPS TO TAKE BEFORE WORKING AT HEIGHT

- Check there is a safe method of getting to and from the work area. Decide what particular equipment will be suitable for the job and the conditions on site.
- Make sure work platforms and any edges from which people are likely to fall have guardrails, toe boards or other barriers.
- Make sure that the equipment needed is delivered to site in good time and that the site has been prepared for it.
- Check that the equipment is in good condition.
- Make sure that whoever puts the equipment together is trained and knows what they are doing.
- Make sure that those who use the equipment are supervised so that they use it properly. The more specialised the equipment (eg MEWPs, boatswain's chairs and rope access equipment), the greater the degree of training and supervision required to ensure safety.
- Check any equipment provided by another company to make sure it is safe before using it on site.
- Find out who to tell if any defects need to be remedied or modifications need to be made and keep them informed.

### REMEMBER:

- Only when other methods are not reasonably practicable or when work platforms cannot comply with all requirements for safe work should a way of arresting falls that provides collective protection to all those who are working be used.
- If no other means of providing a safe place of work at height is available then an appropriately anchored harness (personal fall arrest) should be worn. However, whenever fall-arrest harnesses are used, a rescue method must be available should the user fall and be left suspended in their harness.
- Harnesses may also be needed to protect those working to put out guard rails.
- When selecting a safe system of work at heights, all the risks have to be considered before one method is selected. If harnesses are used, is there sufficient clearance from the ground to allow the shock-absorbing lanyard or inertia reel to fully extend?

- Before installing or using any system of work to enable safe work at height to be carried out, check that there is adequate clearance for equipment. For example, overhead power lines can be a risk when erecting scaffolds or using MEWPs; there can be a risk of crushing against nearby structures when mobile access platforms are manoeuvred and that the ground is strong enough to support the MEWP.
- Ladders should always be secured if possible, and be primarily used for access and only be used at workplaces to do light work of short duration, and then only if it is safe to do so. It is generally safer to use a tower scaffold or MEWP, even for short-term work. Heavy work activity carrying heavy loads should never be carried out from a ladder. When using a ladder ensure that the person on the ladder always has three points of contact, ie two legs and a hand.

### FURTHER READING:

HSE INDG 290 The Lifting Operations and Lifting Equipment Regulations, 1998 a simple guide

HSE WPT02 Access to vehicles information sheet

<http://www.hse.gov.uk/falls/casestudies/tankcontainer.htm>

BS 8460 2005 The Safe Use of Mobile Elevating Work Platforms

HSE Construction Information Sheet No58 The Selection and Management of MEWPs

HSE INDG 402 The Safe Use of Ladders and Step Ladders

HSE CIS 10 Tower Scaffolds

BS EN 365 2004 Personal Protective Equipment for the Prevention of Falls from Height

HSE INDG 367 Inspecting Fall Arrest Equipment made from Webbing

- [The Work at Height Regulations 2005](#)
- [Work at Height Regulations - a brief guide. INDG 401](#)
- [5 Steps to risk assessment. INDG 163](#)
- [Preventing falls from boom-type mobile elevated work platforms. MISC 614](#)
- [Construction industry Work at Height Regulations - question and answer brief](#)
- [Safety notice - Avoiding trapping/crushing injuries to people in the platform of mobile elevating work platforms \(MEWPs\)](#)
- [The selection and management of mobile elevating work platforms](#)
- [MEWPs - avoiding trapping / crushing injuries](#)

## Work-Related Upper Limb Disorders

Upper Limb Disorders (ULDs) are a significant risk in the meat processing industry. The term ULD refers to damage to the muscles, tendons or nerves in the hands, arms, shoulders and neck. Some ULDs are recognised medical conditions such as:

- Tendinitis – inflammation of tendons in the wrist or shoulder
- Tenosynovitis – inflammation of the tendon sheath in the wrist
- Carpal tunnel syndrome – numbness and tingling in the hand caused by pressure on the median nerve where it passes through the wrist
- Epicondylitis – inflammation at the elbow, often called ‘tennis elbow’.

Other ULDs are less well-defined but can still have serious consequences.

Initial symptoms typically include aches and pains that recover with rest, swelling, restricted movement and creaking joints (‘crepitus’). If nothing is done to prevent further exposure to the injury, the pain can become continuous and strength is reduced, making it difficult to carry out simple tasks at work and at home. Recovery from serious injury can take years and some people may be left with permanent disability. Treatment is very difficult. There is no way of screening in advance to identify individual workers who are more likely to develop ULDs.

It is therefore important to focus on prevention before long term harm results when there is a risk of ULD in the workplace.

Hazards in the workplace that can cause a risk of ULD include:

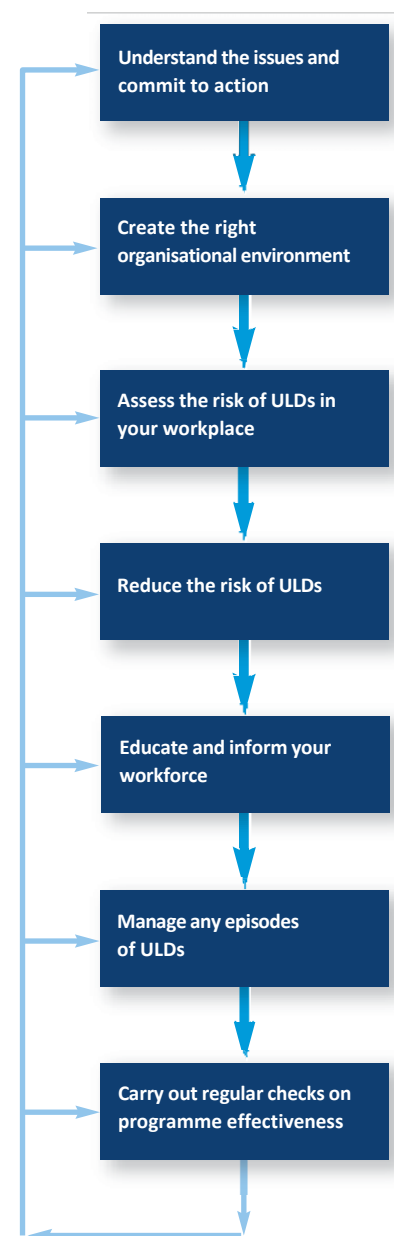
- Repetitive work
- Uncomfortable working postures
- Sustained or excessive force
- Carrying out a task for a long period of time
- Poor working environment and organisation (e.g. temperature, lighting and work pressure, job demands, lack of work breaks)
- Individual differences and susceptibility (some workers are more affected by certain risks because of their age, gender, height, etc.)

The way the work is organised and managed can reduce the risks of ULDs or it can make them worse.

There is unlikely to be any risk in retail butchers as the work is varied with little chance of prolonged periods of repetitive work. However there may be risks for catering butchers and small wholesale cutting and packing operations where individual workers may spend considerable time carrying out repetitive tasks.

In its guidance on ULDs – [HSG60, Upper Limb Disorders in the Workplace](#) (downloadable free from the HSE website) – the HSE outlines a 7-step approach to the management of ULD risks.

This guide gives some brief advice on how the HSE approach can be used in the meat industry and also points to other guidance that can help with managing the risk.



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Note that the HSE approach starts by identifying the risks in the workplace and reducing them where possible.

But it also refers to the need to involve the workforce in the process. Consultation with the workers or with health and safety reps where they exist is crucial to the identification and elimination of risk and to monitoring the success of the programme to manage ULD risks.

The design and function of an operating line has potential ULD consequences for both your own employees and for Food Standards Agency staff who work along side them. It is therefore important to include the FSA staff in any consultation.

Where the risk cannot be completely eliminated it is important to have systems to encourage early reporting of symptoms so that individual workers who are more at risk of developing serious injury can be protected.

Workers may be reluctant to report early symptoms because of concerns about losing their job or being accused of malingering.

Through consultation with the workers and their reps it should be possible to convince employees that early reporting is essential to see what can be done to prevent more serious injury. It should be clear that everything possible will be done to help the worker to carry on working or to find suitable alternative work if necessary.

### ASSESSING ULD RISKS

There are a number of tools available to help identify ULD risks. In [HSG60](#), the HSE provides an initial 'risk filter' which can be used to spot individual tasks that may carry a risk of ULD and more detailed risk assessment worksheets that can be used when the filter suggests there are likely to be problems.

The HSE website also gives a link to the '[RULA](#)' (Rapid Upper Limb Assessment) scoring system developed by ergonomists from Nottingham University which gives a numerical score for ULD risks after you work through a series of options.

More recently, the HSE have also developed the [ART tool](#) (Assessment of Repetitive Tasks Tool). Similar in concept to the earlier MAC tool (Manual handling assessment charts tool), the ART tool can be useful where work involves rapid repetition – e.g. on boning lines or packing work stations. The tool gives scores for each of the risk factors associated with repetitive work and an overall score for the task. The HSE website also includes some on-line training in the use of the ART tool.

All the risk assessment tools require involvement of the workforce. Even if professional ergonomists are hired to advise on ULD risks, they will need to engage with the workers to identify all the risks. Research has shown that this 'participative ergonomics' approach has other benefits as well because it helps identify practical solutions to prevent or control ULD risks.

Trade unions have developed body-mapping techniques which health and safety reps can use to identify potential problems and solutions. Body mapping basically involves structured discussion with the workers to identify which bits hurt when they are working. The technique very quickly identifies any common pattern which might indicate a ULD risk.

### MANAGING ULD RISKS

#### Control

#### Prevention

Where possible, it is best to design out the risk. This can be done by workstation design, the layout of conveyors and equipment, design of tools and equipment.

The main aim should be to avoid the need for workers to adopt awkward postures – e.g. working with their hands above head height or while stretching across a conveyor or table. Most work, especially forceful cuts or gripping and lifting tasks should be done within the ‘comfortable reach zone’ and with the wrist and elbow close to the neutral position. HSE provides some useful advice on the ergonomic design of conveyor belt systems which recommends working heights and reach distances (for example repetitive handling should be done in a zone 450 mm in front of the body).

Where possible workstations should be adjustable to suit the height of the worker.

Mechanical de-boning systems are now widely used in beef-boning operations. They reduce the risk of ULD by reducing the force needed when making cuts and by removing the need to support the weight of heavy quarters or primary cuts with the non-knife arm. However, care is still needed to make sure that workstations are correctly adjusted to the height of the workers and jobs may need to be rotated to avoid having one worker doing the same repetitive task for prolonged periods.

Where knives or other hand held tools are used it is important that the handle allows a secure grip which spreads the pressure evenly across the palm when force is applied. Generally a 40mm diameter handle should provide a comfortable grip for most workers. If gloves have to be worn, consideration may also be needed to how the glove affects the grip. Well-designed and properly-fitted gloves can help with grip. But a smooth wet glove on a slippery handle or an ill-fitting glove can increase the risk. So-called ‘ergonomic’ handles with finger indentations should be avoided as they will not fit everyone’s hand and this can result in pressure spots where the ridges on the handle press against the palm.

Apart from the fact that sharp knives are safer to use, they can also greatly reduce the force that needs to be applied to make a cut.

In areas such as packing lines the amount of repetitive work can be reduced by the layout and, for example, by designing packaging so that product can be slid into the package rather than being picked up and placed into it.

Cold temperatures can increase the risk of injury because they restrict blood flow. In fresh meat processing rooms temperatures are kept low for hygiene and quality purposes. Care should be taken to avoid cold draughts on the shoulders and neck of workers.

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Vibration from hand-held tools is not a common problem in the meat industry, but there are some tools which do transmit vibration to the hands and fingers. Vibration is recognised as a significant risk factor for carpal tunnel syndrome so it is important that exposure is kept to a minimum.

### **Organisational Controls**

Where the risks cannot be completely removed, the way the work is organised can help to reduce the risk.

Job rotation is widely used. Moving workers between different tasks which require the use of different grips and different muscle groups avoids prolonged repetition. However it is important that there is sufficient difference in the tasks and that the rotation is frequent enough to allow the joints and muscles to recover. Job rotation can also be difficult where workers like working alongside their mates or prefer certain tasks to other ones, so it has to be well managed. It is a good idea to keep a written record of job rotation systems along with training records for workers.

Rest breaks are very important. Where highly paced, repetitive work is being done, productivity can fall quite quickly after the start of the shift. Ideally scheduled breaks should be timed so that workers get a rest before their arms or shoulders become fatigued. It is also important that workers understand the need to take scheduled breaks and to use them as an opportunity to rest and recover.

In addition to scheduled breaks there is some research that suggests that so-called 'micro-breaks' – natural pauses which may last only a few seconds or minutes – can help to maintain productivity and reduce the risk of injury. Some businesses have found that training workers in 'micro-exercises' – simple stretching or relaxation exercises for shoulders, hands or fingers that can be done during micro-breaks – can help, however they need to be introduced with care. They may help to make workers aware of the natural micro-breaks and to use the opportunity to relax muscles that have been held in tension. But workers may need to be persuaded to buy into the idea and it is important that the exercises are designed by someone with sound knowledge of bio-mechanics such as a physiotherapist or ergonomist.

Job rotation and the use of exercises during micro-breaks will only work if there is time to do them. So control of work pace is also an important issue. Throughput in a well-designed plant with experienced workers can be very high. But it must be recognised that there are physical limits to how fast and how long people can work without a rest. ULD risks are higher where workers have little or no control over the pace at which they work.

Line speed, performance targets, payment schemes such as bonuses or piece work and staffing levels can all be important factors. Where it has been possible to increase line speed through automation or changes to process design, it is important to watch for any tasks which still require repetitive manual effort – e.g. take-off from conveyors.

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Workers should be trained so that they know about the risks and understand the importance of reporting early symptoms. In the meat industry and in other sectors, quick access to physiotherapy or rehabilitation advice when early symptoms are reported can help to prevent more serious injury and reduce sickness absence as a result. Some businesses buy in physiotherapy services direct. Others have been able to access such services through their Employer Liability insurers.

Training in working methods to reduce the risk – for example by showing workers the best order and directions in which to make cuts when boning – is important. It should not be assumed that workers will instinctively know what is best. Where new equipment is introduced, workers need to understand how to use it and how to adjust it.

New workers and any worker who has been off for a long period –especially if the absence was caused by a suspected WRULD should be introduced to the work gradually.

### MONITORING AND REVIEWING

Whatever arrangements you introduce to manage the risk of ULDs it is important to monitor to check that they are working. And, as with any other risk, there is a duty to review procedures on a regular basis or if your monitoring results suggest they may not be working as well as they should.

Monitoring can be done by looking at reports in the accident book and at sickness absence figures. But these, on their own, may not give you a true picture. As ULDs often develop over time workers might not use the accident reporting system to record incidents where pain is serious. Workers may also be reluctant to report ULDs because of fears about their job.

Regular communication with the workforce and their representatives can help to give a more accurate picture. Use of surveys, anonymous questionnaires and body mapping can help to identify areas where there are cluster of symptoms that may be an indicator of risk.

Monitoring following any change to production methods or introduction of new equipment is particularly important. Initially any change may result in an increase in complaints about aches and pains. This can be due people's natural resistance to change and also due to some period of adjustment as workers' bodies settle into the new routine. However if complaints persist and there is clear pattern that shows a significant effect on particular parts of the body, then this suggests that a review is urgently needed.



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## FURTHER INFORMATION

**HSE** Upper Limb Disorders in the Workplace, HSG60, HSE Books, 2002

Free download <http://www.hse.gov.uk/pubns/priced/hsg60.pdf>

**HSE:** Ergonomic considerations for designing and selecting conveyor belt systems, 2005.

<http://www.hse.gov.uk/waste/conveyorbelt.pdf>

**HSE:** web-based guidance <http://www.hse.gov.uk/msd/uld/index.htm>

**HSE:** ART tool, 2010 <http://www.hse.gov.uk/msd/uld/art/index.htm>

**Usdaw:** Body Mapping – Telling Where It Hurts, 2009

<http://www.usdaw.org.uk/adviceresources/resources/healthandsafety/bodymapping-tellingwherei.aspx>

## Fire Risk Assessment (Revised August 2013)

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The Regulatory Reform (Fire Safety) Order 2005 for England and Wales and the Fire (Scotland) Act 2005 for Scotland requires the employer or other responsible person to carry out a fire risk assessment of the premises.

The regulations require the responsible person to appoint a competent person to assist in the undertaking of preventative and protective measures including the production of the fire risk assessment. Except where a responsible person has sufficient training or knowledge, he must appoint a competent person to assist in complying with these requirements. A competent person is a person who has sufficient training and experience or knowledge.

As a guide only, there are two recognised levels of fire risk assessment. These are:

- Low/normal – examples include single occupancy premises, no more than 50 litres of highly flammable materials are stored on the premises, there is no sleeping accommodation, the premises are not licenced and the premises are mostly open plan.
- High risk – examples include multi-occupancy premises, more than 50 litres of highly flammable materials are stored on the premises, sleeping accommodation is provided, is a licenced premises or the internal layout is such that the means of escape is complex or on several levels.

As an example, a butcher's shop is likely to fall within the low/normal risk category whereas a factory, market building or abattoir would almost certainly be a high risk premises.

### CONDUCT OF A FIRE RISK ASSESSMENT

#### STEP 1: IDENTIFY THE FIRE HAZARDS

This means looking for sources of heat, fuel and oxygen which together might lead to a fire. You need to identify:

- Sources of ignition such as naked flames, heaters or some commercial processes
- Sources of fuel such as built up waste, display materials, textiles or overstocked products
- Sources of oxygen such as air conditioning, medicinal or commercial oxygen supplies
- You should also consider what existing measures are in place to control the hazards

#### STEP 2: IDENTIFY THE PEOPLE AT RISK

You will need to identify anyone who may be affected, such as:

- People working near to fire hazards
- People working alone or in isolated areas (i.e. roof spaces or storerooms)
- Maintenance staff, contractors, passers-by and people present outside normal working hours such as cleaners and security guards
- Visitors and members of the public
- Individuals and groups who may be especially at risk, e.g. young or inexperienced workers; people with mobility or sensory impairment; pregnant workers; members of the public where they are permitted on your premises, such as children or parents with babies, elderly or infirm people, etc.

### STEP 3: EVALUATE, REMOVE, REDUCE AND PROTECT AGAINST FIRE RISK

This involves evaluating the level of risk in your premises. You should remove or reduce any fire hazards where possible and reduce any risks you have identified. For example,

- Replace highly flammable materials with less flammable ones
- Make sure you separate flammable materials from sources of ignition
- Have a no smoking policy

When you have reduced the risks as far as possible, you must assess any risk that is left and decide whether there are any further measures you need to take to make sure you provide a reasonable level of fire safety. The evaluation of risk will take account of the fire risk assessor's opinion of the likelihood of fire, the extent of injury that could occur and the number of people who could be affected.

### STEP 4: RECORD, PLAN, INSTRUCT, INFORM AND TRAIN

It is always good practice to record the significant findings of the fire risk assessment, the steps that you have already taken and those that you plan to take in order to reduce the risk. In many cases the law requires that the significant findings of the fire risk assessment and details of those persons especially at risk are recorded.

- Record significant findings and actions taken to remove/reduce the risk from fire
- Develop and implement an appropriate emergency plan
- Inform and instruct relevant persons on the actions to be taken in the event of fire
- Deliver training to employees, particularly those with specific duties such as fire marshals.

### STEP 5: REGULARLY REVIEW THE FIRE RISK ASSESSMENT

- Whenever you have cause to consider it is no longer valid, e.g. after a significant incident or "near miss"
- If there has been a significant change in the workplace, e.g. changes to plant, equipment, processes, or substances used etc.
- If there has been a significant change in the number, character or needs of persons who use the building

The risk assessment document must be available for inspection by the local authority, fire brigade or your employee's representatives.

### FOOD MANUFACTURING SECTOR – SPECIFIC RISKS & RECOMMENDATIONS

Given the nature of our operations and the materials used in the construction of many premises, a number of specific/enhanced risks exist. In summary these are:

- **Portable electrical equipment** – should be PAT tested. Temporary electrical installations including the use of gang plugs should be removed and made permanent as soon as possible. Do not overload such equipment and put in place arrangements for the visual inspection of cables, etc.

Where portable heaters are permitted, ensure that your staff are trained not to leave them switched on when the area is unattended. All portable heaters should be kept a minimum of 2 meters away from combustible materials (refer to manufacturers recommendations).

- **Battery charging** – charging locations for electric pallet trucks, forklift trucks, floor scrubbers etc. should be sufficiently ventilated to avoid the accumulation of potentially explosive gases. Where food safety constraints permit, charging locations should be outside, away from the main factory. Cables become damaged due to being run over by equipment or not unplugging them before removing the equipment. Consider installing hangers to prevent the cables running across floors and train staff to check the cable has been unplugged before removing. Charging devices should be secured to a wall or mounted on a non-combustible platform and protected from impact caused by moving equipment. A CO2 extinguisher should be in close proximity and it is recommended that a smoke detector is installed in the area where charging is undertaken as they will detect a fire before heat detectors will.
- **Fixed electrical installations** – should be inspected at the necessary frequencies. Thermography should also be undertaken to identify potential sources of heat and equipment damage. Where possible, it is recommended that sites purchase their own thermal imaging camera to verify completion of remedial works identified during the inspections and newly installed equipment. The camera can also be used to monitor electrical services passing through combustible panels to identify potential heat sources.
- **Combustible panels** – a variety of panels exist ranging from mineral wool, PIR and combustible panels made of polystyrene or polyurethane. Panels require close management and should have a proactive management system in place for visual identification of panel damage and de-lamination. Where electrical services cannot be routed from passing through the panel, it is recommended that a 'collar and cuff' is fitted through the panel to avoid cable damage which could result in heat accumulating inside the panel increasing the risk of fire. A fire inside a combustible panel would turn into a liquid fire and rapidly spread to other areas. Other combustible materials such as packaging should not be placed alongside combustible panels.

Consider the materials permitted for filling holes in panels. A number of expandable fire foams exist on the market and whilst some will withstand a fire for a period of time, they will nevertheless generate massive amounts of smoke before they combust. In many situations, smoke will cause more damage than the actual fire.

- **Hot work** – given the nature of the panels in use on site, it is prudent to identify the type of panels in place. Where panels are combustible, hot work should not be permitted in close proximity, generally taken as 10 meters radius. Where possible all hot work activities should be conducted outside, away from the main buildings or in properly constructed locations such as designated welding bays in engineering workshops, etc. When using contractors, ensure they have adequate public liability insurance and that no specific exemptions exist within the policy relating to hot work. Where hot work has to be carried out internally, consider the issue of a permit to work and introducing a post-hot work fire watch.

- **Doors** – investigating a fire alarm can be a hazardous activity as it is difficult to see what is on the other side of the door particularly in areas like plant rooms and roof voids. Consider installing peep holes in doors to enable those responding to an alarm to look through the door before opening it.

Depending upon the type of fire doors in use, the fire brigade might be delayed in accessing the site if they struggle to open a door from outside. Depending upon your security arrangements, consider installing 'simplex' locks to fire doors which will speed up the brigade's access to the building.

During a fire, a build-up of heat and gases will occur. Most fire doors will simply be pushed open by this increase in pressure allowing the fire to spread. Consider installing fire doors with a latch on to assist reduce the spread of fire.

- **Consumables** – should be removed whenever possible at the end of each working day and returned to an external store. Examples include packaging, pallets, chemicals, etc. When considering appropriate locations, storage areas should be as far away from the main building as possible, however away from perimeter fences to reduce the potential for arson. (When considering suitable external locations, the interaction of pedestrians and vehicles should be carefully considered to ensure that you do not introduce a risk of pedestrian collisions with vehicles).

A sample fire risk assessment check list can be found at the end of this guidance note.

For further guidance and information:

[www.fia.uk.com/en/resources/fia-publications.cfm](http://www.fia.uk.com/en/resources/fia-publications.cfm)

[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/14882/fsra-factories-warehouses.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/14882/fsra-factories-warehouses.pdf)

PAS 79:2012 Fire Risk Assessment: Guidance and a recommended methodology

**FIRE SAFETY RISK ASSESSMENT BUILDING**

The purpose of the Fire Safety Risk Assessment check list is to aid the Fire Risk Assessor in carrying out a thorough Fire Risk Assessment. The answer to all questions should be Yes or Not Applicable. If the answer to any question is No, the Fire Risk Assessor should review the Fire Safety arrangements. When completed, this Check Sheet is to be enclosed in the FSMP file.

**Fire Safety Measures**

Is the system for controlling the amount of flammable and combustible materials operating effectively?

Yes	No	N/A
✓	✓	✓

Are all flammable substances and combustible materials stored safely?

Yes	No	N/A
✓	✓	✓

Are heating appliances fixed in a position at a safe distance from any combustible materials?

Yes	No	N/A
✓	✓	✓

Have all electrical items been PAT?

Yes	No	N/A
✓	✓	✓

Are all electrical protective devices suitable for purpose?

Yes	No	N/A
✓	✓	✓

Are lengths of cable kept to a minimum/fully unwound dependent on load?

Yes	No	N/A
✓	✓	✓

Are cable runs only where damage will not occur and not under floor coverings or through doorways?

Yes	No	N/A
✓	✓	✓

Is the upholstery of furnishings in good condition?

Yes	No	N/A
✓	✓	✓

Is the workplace free from accumulations of waste rubbish and other combustible materials which could catch fire or be set alight?

Yes	No	N/A
✓	✓	✓

Are there suitable facilities for control and disposal of smoking materials?

Yes	No	N/A
✓	✓	✓

Have measures been taken to reduce the risk of arson?

Yes	No
✓	✓

Remarks

**Means of escape**

Are there sufficient exits for the number of people present?

Yes	No
✓	✓

Do exits lead to a place of ultimate safety?

Yes	No
✓	✓

Are all gangways and passages free from obstruction?

Yes	No
✓	✓

Are all internal fire doors clearly marked by notices?

Yes	No	N/A
✓	✓	✓

Can all fire safety signs and the exit notices be clearly seen?

Yes	No
✓	✓

Are self-closing devices on fire doors in good working order?

Yes	No	N/A
✓	✓	✓

Where appropriate, do doors used for means of escape open in the direction of travel exit?

Yes	No	N/A
✓	✓	✓

Are all doors, used for means of escape purposes, available for use and can they be opened easily and immediately without the use of a key? *Note: Check security requirements*

Yes	No	N/A
✓	✓	✓

Are the floor surfaces on escape routes free from tripping and slipping hazards?

Yes	No
✓	✓

Are the surfaces linings on the escape routes of required class?

Yes	No
✓	✓

Are all vents and service ducting suitably protected to prevent the spread of fire, smoke and heat?

Yes	No	N/A
✓	✓	✓

**Lighting**

Is there sufficient lighting to illuminate internal and external escape routes?

Yes	No
✓	✓

Is there illumination at changes of level and direction?

Yes	No
✓	✓

Are call points and fire equipment sufficiently illuminated?

Yes	No
✓	✓

Remarks

**Fire Fighting Equipment**

Is there sufficient firefighting equipment of the correct type to cover risks?

Yes	No
✓	✓

Are portable fire extinguishers and fire blankets suitably located and available for immediate use?

Yes	No
✓	✓

Have portable fire extinguishers and hose reel installations been serviced within the last 12 months?

Yes	No
✓	✓

**Fire Warning System**

Is there a sufficient fire warning system installed?

Yes	No	N/A
✓	✓	✓

Is the warning system in good working order?

Yes	No
✓	✓

Can the fire alarm system be raised without placing anyone at risk from fire?

Yes	No
✓	✓

Are the call points unobstructed, clearly visible and suitably indicated?

Yes	No
✓	✓

**Maintenance and testing**

Are suitable arrangements in place to examine:  
Means of Escape

Yes	No	N/A
✓	✓	✓

Fire fighting equipment

Yes	No	N/A
✓	✓	✓

Fire Alarm System

Yes	No	N/A
✓	✓	✓

Emergency Lighting

Yes	No	N/A
✓	✓	✓

Remarks



**Fire Instruction**

Are effective arrangements in place to provide suitable training to all personnel?

Yes	No
✓	✓

Are suitable senior personnel nominated to coordinate training and evacuation procedures and are deputy(ie) appointed as necessary?

Yes	No
✓	✓

Are all personnel aware of the action to be taken in the event of a fire?

Yes	No
✓	✓

Are suitable rearrangements in place for a roll call to be taken?

Yes	No
✓	✓

Are coordinating officers sufficiently prepared to brief the fire service on arrival at the building?

Yes	No
✓	✓

Are specialist officers available to advise the attending fire service on special risks within the premises?

Yes	No
✓	✓

Are fire instructions clearly displayed throughout the workplace?

Yes	No
✓	✓

In premises providing sleeping accommodation or medical care, are there a Sufficient number of trained personnel to assist in evacuating handicapped persons or disabled patients?

Yes	No
✓	✓

**Good House Keeping and the Prevention of Fire**

Are adequate arrangements in place to check good housekeeping practices at regular intervals?

Yes	No
✓	✓

Are systems in place for the control and storage of flammable and combustible material?

Yes	No	N/A
✓	✓	✓

Remarks



## Isolation of Plant and Machinery (New Guidance Note April 2012)

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### BACKGROUND

Statistically, the vast majority of serious machinery accidents resulting in death or amputated limbs occur when hazardous parts of machinery are accessed while some form of energy is still connected to, or stored in, the machine. If the machine is isolated from all sources of energy and any stored energy, e.g. compressed air, is dumped\* then it cannot cause any harm other than striking against sharp parts or hot parts if not allowed to cool.

\* note: when air or hydraulic fluid is dumped parts should rest in the 'safe' position, if this is not the case parts may need to be held still or confined by other means or manually propped.

### What are the hazards?

- Electrocution: the majority of food plant machinery is on a 3 phase supply (415 volts) which can easily cause death
- Compressed air: eye injuries and injection which can also be fatal
- Steam: scalds and burns
- Moving parts: in addition to parts that create nips and drawing in risks, e.g. rotating shafts, many food machines have cutting parts. There have been many incidents where live machinery has either been left running or has started up during cleaning, maintenance and clearing and has resulted in death or amputation of limbs.

### When do accidents occur?

When machines need to be accessed beyond the guarding and safety devices which are designed to protect operators. Usually during unblocking, cleaning or maintenance operations.

### What is isolation?

Turning off the supply of energy to the machine. However many accidents occur when the supply is turned off but not locked off.

### When to isolate:

- For all clearing, cleaning or maintenance work.
- For all installation, decommissioning or removal work.
- When a machine has become unsafe.
- When a machine is not currently in use (some machines have sleep modes and may appear 'dead' when they are not).

### If there are no significant hazards can a machine be worked on without isolation?

If the person working on the machine cannot come into contact with any hazards e.g. energy sources or moving/cutting parts then it possibly could be done but it is bad practice and may lead to people working live when there are hazards present.

The best policy is to operate total lock off as the norm and to only work live when there is a specific need and other controls have been put in place.

### Methods of isolation:

The simplest form of isolation is the removal of a key, for example many agricultural machines are driven from the tractor so removing the key before leaving the cab isolates them, outdoor compactors usually have the key removal system.

There are also key swap systems where a trapped key is removed from the control panel to open a door - ovens, freezers and robots often have this system. Recently the same principle has been adapted to lock off the brakes on vehicles.

Most plant/process machinery can be locked out electrically with a lockout clamp through an isolator switch and a padlock. Padlocks should be identified to individuals. Where more than one person works on a machine, they all should put their own lock on the clamp. The isolation point should be away from the machine but as close as possible to it. Care should be taken as often people lock off on the machine which will prevent operation but still leave power to it. There are other devices which fit over plugs and valves and can also be locked with a padlock. If the only means to isolate is a plug, then the plug must be locked off.

For installation, decommissioning or when equipment is put out of use, it is usual to lock out at the main switch or distribution board

### Live working:

Situations do arise when power is required to carry out the work. For example, in planned cleaning operations the most practical way to clean a conveyer is to hose it as it runs. Provided the electrical parts are protected, this operation is low risk. However, this must be under strict safe working procedure, operators must be trained and training documented, particularly to ensure no one reaches inside the conveyer to remove debris.

The need may arise for qualified, trained people to seek authority for live working (for example for electrical testing). To do this, the job must have a written risk assessment carried out and justified by safety rather than just the need to do it. Usually additional controls will be needed and managed under a permit to work.

## LIVE WORKING MUST ALWAYS BE JUSTIFIED BY SAFETY

### Further information:

There are many publications of this subject but compliance is required under Regulation 13 of the [Electricity at Work Regulations](#) and the HSE has a booklet, 'Electricity at Work – Safe Working Practices (HSG85)'.

## Gas Safety (New Guidance Note April 2013)

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### DESCRIPTION

Across the meat processing sector a wide range of gases are used in a variety of applications ranging from animal stunning to packaging and in a host of activities in between, such as refrigeration and maintenance.

Incorrect use, storage and handling of such gases could result in asphyxiation, burns, fire, explosion, etc. Therefore, it is critical that correct safety controls are in place.

### Hazards

The hazards associated with the use of gases can be broadly defined as:

- **Flammable gas risks.** Fuel gases all present a risk of asphyxiation but they also present a more serious risk, that of fire and explosion. This risk can be increased if the gas container is stored inside a building or within a confined space. Even small quantities of escaping gases in the right conditions could form an explosive atmosphere. For this reason, many flammable gases are 'stenched', that is they have an additive included which provides an odour to assist identification of a leak. Examples of flammable gases are propane and acetylene.
- **Oxygen enrichment.** Oxygen normally makes up 21% of the air that we breathe. Oxygen enrichment in the atmosphere, even by a few per cent, can dramatically increase the risk of fire. Furthermore, enrichment of oxygen levels can bring about spontaneous combustion of certain oils and greases necessitating the use of special lubricants in processes where oxygen enrichment may occur.
- **Inert gas risks.** Gases such as nitrogen or argon are not flammable and are colourless and odourless. By their very nature, inert gases are also non-toxic. However, they can displace oxygen from the atmosphere. Oxygen deficiency cannot be readily detected by an individual, but can be life threatening in the right concentrations. At concentrations below 12%, workers quickly lose consciousness and there is a significant risk of death by asphyxiation.
- **Cryogenic gas risks.** Many industrial gases are stored in a liquid state at very low temperatures, typically -180° to -190° Celsius, and gases such as nitrogen, carbon dioxide, helium and argon are used in cryogenic processes. By the very nature of this activity, it introduces risks of cold burns, frost bite and hypothermia.

Some gases also have subsidiary properties making them corrosive, harmful or irritants. Within the above, an increase in the hazard could be experienced by undertaking work in a confined space or hot work activities.

### SCOPE

This guidance note addresses two separate areas of gas safety: general gas cylinder safety arrangements and bulk gas safety arrangements.

It is intended to only provide an overview of general safety advice and to direct the users to further, specific information. The content of this guidance note does not apply to a site considered to be a COMAH operation, e.g. over 50 tonnes of liquefied petroleum gas [LPG]. Further guidance is available in L111 'A guide to the Control of Major Accident Hazards' Regulations 1999 [COMAH].

### BULK GASES

Irrespective of the type of bulk gas in use on the site, LPG, ammonia, etc. the majority of tanks in the UK are operated and filled in exactly the same way, with the gas supplier usually supplying the tank and associated fittings and the user entering into a supply contract.

There can, however, be a misconception as to who is responsible for the various stages of inspection and maintenance. Bulk tanks are usually owned by the gas supplier but the service pipework and connections may well have been contracted out and therefore become the responsibility of the gas user, meaning that the user becomes responsible for the maintenance.

There is no uniform arrangement for demarcation of ownership. The transition point between supplier and user may be at the end of the bulk tank compound, but is commonly from the first pressure regulating valve or vapour take-off valve.

Often the starting point to determine where ownership lays can be identified by reviewing the service contract or the Written Scheme of Examination provided in accordance with the Pressure Systems Safety Regulations 2000 [PSSR].

### SAFETY OBLIGATIONS ON GAS USERS

There are numerous obligations imposed upon users of gas irrespective of whether or not the gas in use is in bulk or cylinder. Such obligations include:

- **Dangerous Substances and Explosive Atmospheres Regulations 2002 [DSEAR]**  
These regulations apply to work situations where dangerous substances are present or liable to be present, representing a safety risk. The user should:
  - assess fire and explosion risks;
  - implement measures to eliminate or reduce the identified risks;
  - maintain any installed gas system in a safe condition; including ancillary elements such as pipework, etc;
  - provide equipment and procedures to deal with emergencies, and
  - give information and training to employees.

Further advice and guidance can be found within the HSE publication ACoP L138.

- **Pressure Systems Safety Regulations 2000 [PSSR]**  
PSSR aims to reduce the hazards associated with stored energy in pressure systems including pipelines conveying liquids and gases, above 0.5 bar. The user should:
  - Ensure a written scheme of examination is drawn up by a competent person detailing inspection schedule.

The written scheme of examination should include fittings and pipework excluding buried pipework as there is no reasonably foreseeable danger from the release of stored energy.

Further advice and guidance can be found within the HSE publication ACoP L122.

- **Provision and Use of Work Equipment Regulations 1998 [PUWER]**

Service pipework is work equipment which is exposed to conditions likely to give rise to deterioration. Therefore, the user is required to maintain and inspect the service pipework owned by them.

Further advice and guidance can be found within the HSE publication ACoP L22

It is worth noting that the Gas Safety (Installation and Use) Regulations 1998 [GSIUR] do not apply to industrial processes carried out on industrial premises and therefore fall outside of the scope of this guidance note.

In addition to the gas user's safety responsibilities, the gas supplier also has obligations towards the user.

### SAFETY OBLIGATIONS ON THE GAS SUPPLIER

The gas supplier has duties under various regulations arising from the initial installation of any bulk tank and pipework as part of its on-going relationship. Such duties may include:

- ensuring the integrity of the initial installation;
- ensuring that separation distances have been met from the installation to neighbouring networks such as railway lines, etc;
- providing adequate safety information to the user;
- ensuring that the delivery is safely carried out, and
- advising the user of their on-going obligations, such as protecting any vessels and pipework from impact, controlling the presence of sources of ignition, keeping the tank area clear of combustible materials, providing a clear demarcation for maintenance responsibilities, etc.

### GAS SAFETY, GOOD PRACTICE

Examples of good practice in relation to gas safety include:

- Underground pipes should be constructed from polyethylene rather than metals, which reduces the potential for corrosion and the need for visual inspections. If a metal pipe has been installed which is over 15 years old, the HSE will ask for evidence of inspection and replacement.
- Pipework entering a building should be 'sleeved' to prevent damage to the pipe.
- Ideally pipes should be located above ground and adequately supported whilst protecting it from damage caused by the pipe coming into contact with cement, bricks, other pipework, etc. Inspections on pipes should include corrosion protection, condition of supports and a gas tightness test (often referred to as a pressure test).
- Locate tanks and cylinder storage away from surface water drains, gullies, etc.
- Provide good security to prevent unauthorised persons interfering with the tank or opening valves, etc. and causing a spillage of liquids and gases creating a fire risk and potential environmental pollution risk.
- Installation of gas leakage detector systems in circumstances where pipework runs into buildings, such as roof voids, cellars, etc.
- Suitable fire separation between differing gases and buildings e.g. 3 meters separation and 60 minutes integrity. However, refer to insurance requirements before determining the separation.

### Typical Small Scale LPG Bulk Installation

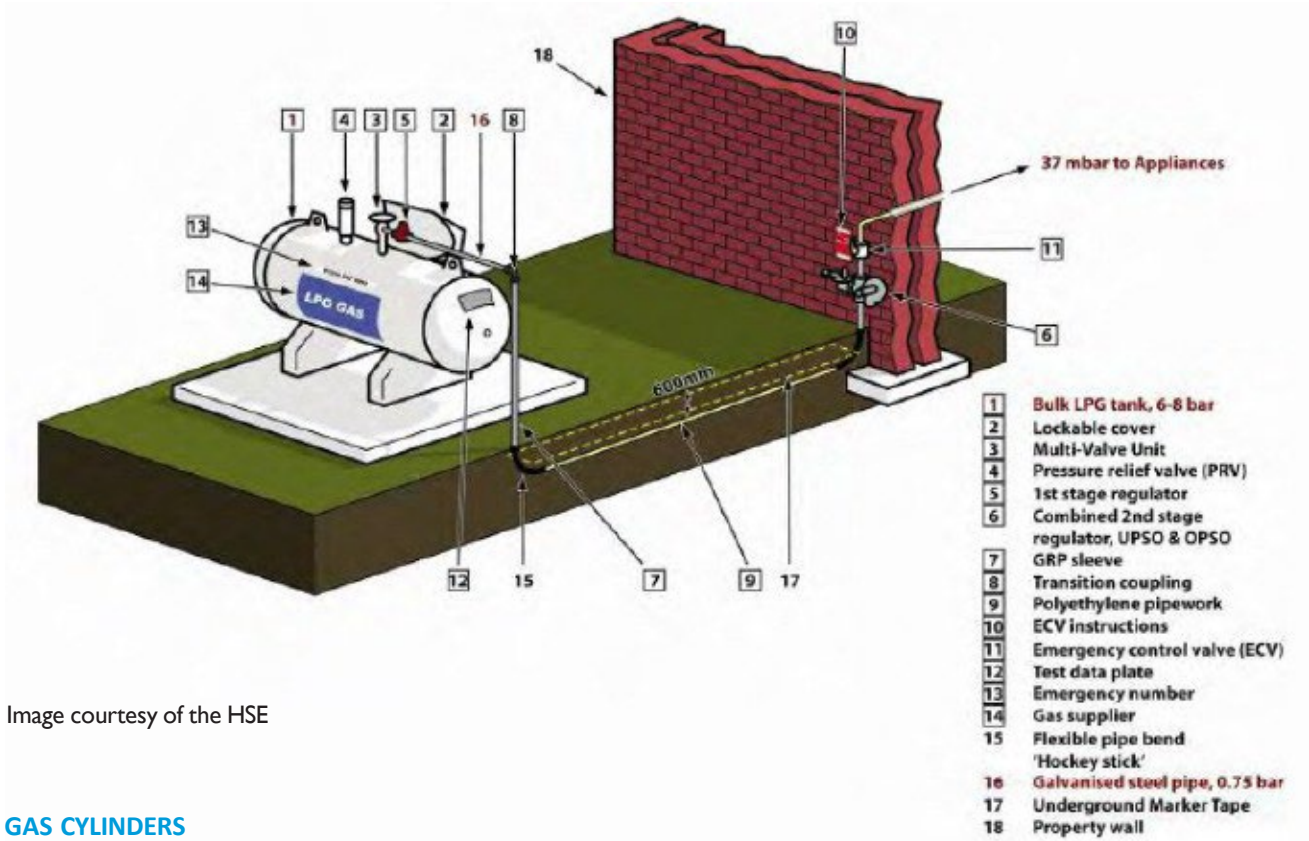


Image courtesy of the HSE

#### GAS CYLINDERS

All gas cylinders should be clearly marked and labelled, providing information on the contents in accordance with the Carriage of Dangerous Goods and use of Transportable Pressure Equipment Regulations 2004 and The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 [often referred to as 'The CHIP Regulations'].

#### STORING OF GAS CYLINDERS

Gas storage areas should be positioned in a well-ventilated area, in the open and away from buildings and perimeter fences by 3 meters and from other plant and equipment such as compressors, waste storage locations etc. Storage should be away from surface water drains and gullies to avoid any environmental pollution in the event of leakage.

In addition, LPG cylinders should be stored separately from other gases. There should not be any drains or gullies near to the tank/cylinders unless a water trap is provided to prevent gas entering the drains. This is because LPG is heavier than air and if a leak were to develop from the tank/cylinder or its controls or pipework or when it is being filled then the vapour could accumulate in an untrapped drain or gully. Ignition of these vapours could then lead to fire/explosion. Where the recommended 3 meter separation distance cannot be met, a 60 minute fire separation wall between the LPG and other gases should be erected which is a minimum of 2 meters high.

In all cases where the requirements of other legislation apply such as DSEAR, the assessment may indicate a need to increase separation distances.



Storage areas should be secure and clearly display 'no smoking' signage. Consideration should also be given to clearly displaying the appropriate Hazchem 'diamond' signs for stored gases, particularly when they are not in clear view.

The HSE publication HSG139 'The Safe Use of Compressed Gases in Welding, Flame Cutting and Allied Processes' contains very useful information relating to the segregation of gases, detailed advice on the safe handling, use and storage, etc.

### Risk Assessment

Employers must risk assess any place where dangerous substances are stored. The assessment should identify the hazards arising from the storage of the dangerous substance and determine measures that will:

- avoid or minimise the potential risk of a spillage or release of a dangerous substance;
- minimise the risk of fire or explosion at the storage location;
- protect the storage area from fires occurring elsewhere, and
- mitigate the consequences of such incidents.

HSE publication LI 35 'Storage of Dangerous Substances' provides detailed guidance and advice on how a suitable and sufficient assessment can be achieved. Furthermore, all substances should be subject to a risk assessment considering the safe handling and use of the substance in accordance with the Control of Substances Hazardous to Health Regulations [COSHH]. Any assessment should not only consider the risks associated with the immediate potential exposure, but should also consider any potential long term ill health effects. Where necessary, health surveillance should be provided if deemed appropriate by the assessment or if the substance is specified in Schedule 6 of the COSHH Regulations.

Further guidance on completing a COSHH assessment is available from the HSE web site, 'A step by step guide to COSHH assessment' [HSG97] or the COSHH Essential web site [[www.hse.gov.uk/coshh/essentials/index.htm](http://www.hse.gov.uk/coshh/essentials/index.htm)]. Advice on health surveillance is available from HSG61 'Health surveillance at work'.

Assessors may also benefit from reviewing other BMPA guidance notes such as GNI-4 [COSHH], GNI-37 [Personal protective equipment] and GN5-36 [ammonia refrigeration plant].

All HSE publications listed are freely available to download from the HSE web site – [www.hse.gov.uk](http://www.hse.gov.uk)



## First Aid (New Guidance Note February 2014)

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### DESCRIPTION

Across the meat processing sector, the scope for accidents occurring is wide. Organisations should assess the likely injuries that occur and ensure that the suitable provision of first aid services is in place.

### HAZARDS

Pages 3–6 of this Guidance Note contain a summary of the key lost time and accident rates across the sector. Comparing this information against your organisation's accident information will enable you to identify the key accidents that may occur.

### SCOPE

The Health and Safety (First Aid) Regulations outline that 'employers must have appropriate first-aid arrangements in the workplace'. Consideration should be given to what health and safety risks may be present and you should conduct a first-aid needs assessment to help decide what arrangements are required.

Most small low-risk workplaces need only a first-aid box and a person appointed to take charge of first-aid arrangements, such as calling the emergency services and stocking the first-aid box. The appointed person does not need specific first-aid training.

If the workplace has more significant health and safety risks, for example you use machinery or hazardous materials, then the workplace is more likely to need a trained first-aider.

Employers must provide all employees with details of the first-aid arrangements

### FIRST AID ASSESSMENTS

Conducting a first aid assessment is a simple exercise which factors in the following information:

- Number of employees – HSE guidance is 1 first aider for 5 to 50 employees in high hazard workplaces or one per 50 or any part thereof if more than 50 are employed. You should, however, factor in any additional requirements to ensure adequate coverage in the event of illness or holidays, etc.
- Does your operation include any high risk activities such as the use of dangerous substances, use of knives resulting in stab type injuries requiring urgent stem of blood loss, etc? You should consider the likely injuries associated; whether any additional first aid equipment may be required, such as stretchers; the location of first aid boxes for speedy response; and how the emergency services can be summoned when required.
- Consider previous accidents and ill health – have first aid provisions been suitable or could improvements have been made?
- Do you have employees with specific needs such as disabilities or specific health problems, etc? You may need to train first aiders to be able to respond to such events, e.g. epilepsy, diabetes.

- Do you have any workers such as vets or employees in remote areas such as farms, etc? Consideration should be given to personal first aid kits and ensuring an effective means of communication and if any special measures are required with the emergency services, etc.
- Working hours – if you have employees working outside of ‘normal working hours’, you should ensure adequate coverage, i.e. nights, weekends.
- The size of the premises is important – if a widely dispersed site or on multiple floors, you should consider how first aid will be provided and if necessary, the casualty will be evacuated.
- Consideration should be given to how long it will take the emergency services to respond and what is the likely time to transfer a person to hospital – as a rule of thumb, if the response and transfer time is less than 10 minutes, no additional facilities or equipment would be required. However, in cases where it is likely to take longer than 10 minutes, consideration should be given to the requirements of additional equipment such as medical grade oxygen, AEDs, additional training for first aiders in monitoring the condition of the casualty, etc.

Further detailed guidance can be found at [www.hse.gov.uk/pubns/books/l74.htm](http://www.hse.gov.uk/pubns/books/l74.htm) and downloaded free of charge.

### First Aid Box Contents

There is no mandatory list of items to put in a first-aid box. It depends on what you assess your needs to be. As a guide, where work activities involve low hazards, a minimum stock of first-aid items might be:

- A leaflet giving general guidance on first aid (e.g. HSE’s leaflet: Basic advice on first aid at work);
- 20 individually wrapped sterile plasters (assorted sizes), appropriate to the type of work (you can provide hypoallergenic plasters, if necessary);
- Two sterile eye pads;
- Four individually wrapped triangular bandages, preferably sterile;
- Six safety pins;
- Two large, individually wrapped, sterile, un-medicated wound dressings;
- Six medium-sized, individually wrapped, sterile, un-medicated wound dressings; and
- A pair of disposable gloves.

This is a suggested contents list only. It is recommended that you don’t keep tablets and medicines in the first-aid box.

### First Aid Training

If your needs assessment identifies the need for first aiders, you must ensure that they are trained either in First Aid at Work (FAW) or at least in Emergency First Aid at Work (EFAW)

- EFAW training enables a first-aider to give emergency first aid to someone that is injured or becomes ill while at work. It involves a minimum of 1 day's training.
- FAW training includes EFAW, but also more detailed training on first aid for a range of specific injuries and illnesses. It involves a minimum of 3 days' training.

Your training may also need to include more detail on applying first aid to specific injuries that are more likely to occur in your workplace.

All work-related first aid training certificates last for three years. Before their certificates expire, first-aiders will need to undertake a re-qualification course to obtain another three-year certificate. HSE also strongly recommends that first aiders receive a short annual refresher course.

You have a number of options for selecting an appropriate first aid trainer. If you use an external trainer, you can use one of the Voluntary Aid Societies (St John's Ambulance, St. Andrew's First Aid or the British Red Cross) or a trainer who provides a regulated qualification or who works within a suitable accreditation scheme. You could also opt to use an independent external trainer or develop your own in-house training, but this will require a lot more work to make sure that the standard of training is appropriate. HSE gives advice on the options in an information sheet - <http://www.hse.gov.uk/pubns/geis3.pdf>.

### ACCIDENT RECORDING AND REPORTING

Arrangements must be in place to record all accidents that occur as a result of workplace activities. The Social Security Act outlines the minimum standard of information that should be documented. This includes:

- Name, home address and occupation of the injured person;
- Full name, home address and occupation of the person completing the entry;
- The date, time and location where the accident took place;
- A brief summary of the accident and any materials used in the first aid treatment; and
- If the accident becomes reportable under RIDDOR, details of when and how reported it was reported and by whom.

There is no requirement to maintain both an accident book and accident report form providing the minimum information outlined above is recorded.

Certain workplace accidents and diagnosed cases of ill-health must be reported in compliance with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR). Further details on reporting of incidents together with access to the HSE electronic reporting portal can be found at [www.hse.gov.uk/riddor/index.htm](http://www.hse.gov.uk/riddor/index.htm).

### **AUTOMATIC EXTERNAL DEFIBRILLATORS (AEDS)**

It is unlikely that your first aid assessment will determine the requirement for an on-site AED. Due to an aging workforce, remoteness of location, etc. a number of employers have purchased such equipment for emergency use on site. Where such equipment is in use, the following guidance should be considered:

- Training – although there is no formal requirement for training, it would be considered best practice for first aiders to undergo initial training in the use of the equipment and refresher training at intervals such as during the first aider 3 yearly refresher training
- Location of the equipment – for maximum effective use, the equipment should be capable of being deployed within 4 minutes therefore a central location should be considered
- Security of equipment – the AED is valuable and if stored in a remote area, it is suggested that either a CCTV is trained on the storage location or the equipment is placed inside an alarmed box.

The Resuscitation Council (UK) can provide further information ([www.resus.org.uk/siteindx.htm](http://www.resus.org.uk/siteindx.htm)) or the British Heart Foundation advises you to contact your local ambulance trust if considering buying an AED as they often have community resuscitation advisors who can help you.

### **FIRST AID ROOM**

A first aid room is usually needed in higher hazard workplaces or larger factories. A first aid room should be conveniently accessible and should have space for a medical couch, chair and additional equipment. It should be well-lit, adequately ventilated and should be kept clean. If the room cannot be reserved exclusively for first aid use then it must be possible to make the first aid facilities available quickly if there is an emergency.

### **LIAISON WITH OTHER SITE USERS**

In conducting the risk assessment, consideration should be given to any other employers or users of the premises who occupy the site e.g. slaughterhouse operators will have FSA personnel on site and both parties should consult on how their first aid obligations might be met. This will be influenced by what is reasonable in the circumstances and the specific nature of the work undertaken.

### **REFERENCES:**

- The Health and Safety (First Aid) Regulations 1981 – Guidance on Regulation, L74, HSE [www.hse.gov.uk/pubns/priced/l74.pdf](http://www.hse.gov.uk/pubns/priced/l74.pdf)
- Selecting a First Aid Training Provider, GEIS3, HSE - [www.hse.gov.uk/pubns/geis3.pdf](http://www.hse.gov.uk/pubns/geis3.pdf)
- HSE First Aid at Work web pages - [www.hse.gov.uk/firstaid/index.htm](http://www.hse.gov.uk/firstaid/index.htm)

## Personal Protective Equipment (PPE) for Visitors to Meat Plants (New Guidance Note February 2014)

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### INTRODUCTION

Guidance on PPE for meat industry staff is contained within [Guidance Note 2-6 “Personal Protective Equipment \(PPE\) in the Meat Industry”](#) available on-line from the British Meat Processors Association (BMPA) web site. GN2-6 briefly covers PPE for contracting and temporary staff and it is the intention of this GN to provide additional guidance on the provision and use of PPE for visitors.

In this Guidance Note it is not possible to cover all the PPE issues that are relevant to the meat industry, therefore it is recommended that GN 2-6 and HSE guidance is used to help duty holders and food business operators decide on what action they need to take. For example, leaflet INDG174 (rev1) entitled Personal Protective Equipment (PPE) at Work, a brief guide, is available free from the HSE website and includes helpful summaries of:

- What is PPE
- What the Regulations require
- Assessing suitable PPE
- Health and safety hazards and appropriate types of PPE
- Training for users
- Maintenance
- CE marking

The full regulations and more comprehensive guidance are contained within Personal Protective Equipment at Work (second edition) reference L25 – available from HSE Books and from the HSE website. See the section on references at the end of this Guidance Note from more information.

*Note: The term PPE is often used generally within the food industry to describe all clothing equipment worn during food manufacture e.g. hairnets, beard snoods, gloves, overalls. This Guidance Note is specific to Personal Protective Equipment as defined in the PPE at Work Regulations 1992. This definition includes all equipment which is intended to be worn by a person at work and which provides protection against one or more risks to health and safety.*

### VISITORS

Traditionally food business operators gave visitors shoe covers, a plastic coat, a hair net and a bump cap when entering a meat plant. This equipment was primarily aimed at reducing the risk of contamination from the visitor rather than providing any personal protection – for example, plastic shoe covers can be the cause of slips when used on wet floors. It is important to understand that the primary role of visitor PPE is to provide protection to the visitor and not reduce the risk of contamination.

The provision of PPE should always be regarded as a last resort to protect against health and safety risks so unless it is essential that visitors enter the production areas it is much better to allow them to watch the process via internal windows or via closed circuit television.

If visitors have to enter the production areas they must be issued with PPE that provides protection for the specific risks involved, for example, noise, low temperatures, low oxygen levels.

Visitors are often given the full guided tour of the plant including all departments so it is important that the PPE provided is suitable for the risks involved in each department and the exposure time to each risk.

As a way of reducing the health and safety risk to visitors it is a good idea to have a set visitor route and timetable. The route is usually from the 'clean' to 'dirty' departments of the plant to reduce the risk of cross contamination. If it is intended for a visitor to remain in a department for an extended time it may be appropriate for some more suitable PPE to be provided to protect against the extended exposure time.

Many staff are reluctant to use PPE and often look for any excuse not to wear some items of PPE that they often perceive as "over the top". It is therefore important that visitors are seen to be adhering to the same rules and applying the same hygiene practices.

Secure suitable facilities should be provided for visitors to leave belongings and outer clothing and to change into PPE. If possible these should be separate from the main staff facilities as a calm quieter environment is much better to instruct visitors in the correct use and importance of using PPE.

### THE MAIN LEGISLATIVE REQUIREMENTS

**The Health and Safety at Work, etc Act 1974** – requires employers and the self employed

to take reasonable precautions to protect the health and safety of themselves, their employees and others who might be affected by their work activities. The term 'others' includes visitors.

**The Management of Health and Safety at Work Regulations 2003** – require employers and the self employed to assess risks to health and safety in order to identify the means of reducing the risks to an acceptable level. When deciding what control measures to take the law requires duty holders to apply the hierarchy of control measures, and this implies that PPE should always be regarded as a last resort to protect against health or safety risks. Elimination of the hazard, substitution with a safer alternative, engineering controls and safe systems of work should always be considered first. However, PPE is a practical solution to many risks associated with the industry and is often used in conjunction with other control measures.

**The Personal Protective Equipment at Work Regulations 1992** - require that suitable PPE is supplied and used at work whenever there are risks to health and safety that cannot be adequately controlled in other ways. The Regulations also require that PPE is:

- properly assessed before use to ensure it is suitable
- fitted properly on the wearer
- maintained in working order
- stored in suitable accommodation
- used by employees in accordance with instructions
- compatible with other items of PPE worn
- effective without increasing overall risk

Employers are also required to provide their staff with information, instruction and training on the use of PPE.

The “PPE at Work Regulations 1992” place an obligation on employers to select “suitable” equipment to protect their employees. These regulations do not apply where other regulations specifically require the provision and use of PPE, for example:

**The Control of Lead at Work Regulations 2002**

**The Ionising Radiation Regulations 1999**

**The Control of Asbestos Regulations 2012**

**The Control of Substances Hazardous to Health Regulations 2002**

**The Control of Noise at Work Regulations 2005**

### **FIT FOR PURPOSE**

You should ensure that any PPE provided is “CE” marked and that it complies with the requirements of the “The Personal Protective Equipment at Work Regulations 1992”. The CE mark signifies that PPE satisfies certain basic safety requirements and in some cases it will have been tested and certified by an independent body. This helps to ensure that the equipment is fit for purpose and suitable to reduce the risks. Only then can a manufacturer display the CE mark on the product.

### **PRACTICAL GUIDANCE ON SELECTION**

The huge range of PPE available can be confusing and potentially misleading. Always check for a CE mark described above. If you are in doubt about selection of correct PPE, contact your supplier or the manufacturer for advice. Implementing the wearing of PPE may involve cultural change within the workforce and employees should be consulted about PPE which they may be required to wear. Obtaining different samples of the same type of PPE (e.g. from different manufacturers) and getting feedback from potential users will help to ensure that the selected PPE is more readily accepted and used.



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## TYPES OF PPE USED IN THE MEAT INDUSTRY

### Eye and Face Protection

The main types of eye and face protection are safety spectacles, goggles and face shields. Safety spectacles can be fitted with prescription lenses if required, but only offer protection to the eyes against certain types of hazard. When liquids or dust are the hazard, goggles (of which there are several categories) or a face shield will usually be required. Goggles give the eyes protection from all angles as the complete rim is in contact with the face. Face shields protect the face and most types can be worn over prescription glasses. Hazards that require eye and face protection include liquid or chemical splash, including biological agents and contaminants, working with cleaning chemicals and vapour or liquid mist and particles from high pressure cleaning tools or some types of powered cutting equipment, e.g. hand-held circular saws.

### Hand Protection

Gloves of various designs can provide protection against a wide range of hazards including cuts, abrasions and stabs, extremes of temperature, skin irritation and dermatitis, contact with chemicals and other hazardous substances including biological hazards.

### Hearing Protection

The Control of Noise at Work Regulations 2005 specify that employers have to provide their employees with hearing protection if they ask for it, and their noise exposure is between the lower and upper exposure action values specified in the regulations (eg between 80 and 85 decibels for daily exposure). Hearing protection should not be used as an alternative to controlling noise by other methods. Food Business Operators should provide hearing protection for visitors and ensure that it is worn in all designated ear protection areas even for short periods of exposure. The type of protection should be suitable for the level and duration of exposure.

### Protective Footwear

The safety boot or shoe is the most common type of safety footwear. They normally have steel toe caps, but may also have other safety features including slip resistant soles, steel midsoles and insulation. Wellington boots, usually made of rubber, protect against water and wet conditions and are suitable for washing and disinfection to maintain hygienic conditions. Visitors are often provided with "slip on shoe covers" but these are not suitable if the plant has foot baths or abrasive floor surfaces. If conventional boots or shoes are provided for visitors use, it is important that a full range of sizes are provided as mis-fitted footwear can create an additional safety hazard. If the same footwear is reused for visitors it is recommended that a disposable liner is supplied.

### Head Protection

There are several types of head protection available including industrial safety helmets or “hard hats” which protect against falling objects or impact with fixed objects, and bump caps that protect against bumping the head (eg walking into a fixed object). Bump caps do not offer adequate protection where there is a risk of falling objects or moving or suspended loads.

The key points to note are to use an adjustable chinstrap, if fitted, to ensure the helmet does not fall off, to check regularly for damage and to replace it after significant impact. The helmet should be worn properly – do not wear it back to front as protection will be greatly reduced.

Visitors are often only provided with hairnets to reduce the risk of contamination but it is important that suitable protective headwear is also provided as visitors often visit storage areas and pass under rails and conveyers.

### Respiratory Protection

Respiratory protection equipment (RPE) is designed to protect the wearer against inhalation of hazardous substances in the workplace air. Respirators (filtering devices) use filters to remove contaminants in the air and are available with a range of different face pieces. Masks and other tight fitting face pieces rely on having a good seal with the wearer’s face in order to be effective, whilst loose fitting face pieces (eg. hoods, ventilated visors and helmets) rely on clean air being provided to the wearer by a fan to prevent contamination leaking in. For more detail on the selection of appropriate respiratory protection (including Breathing Apparatus) see HSE guidance HSG53, Respiratory protective equipment at work-a practical guide. Nuisance dust masks are not protective devices: not classified as PPE, and are not CE marked.

Because the correct use of RPE requires time consuming training it is not normally provided for use by visitors. The best solution is to ensure visitors do not visit areas where RPE is required.

### Thermal Protection

Many workers in the meat industry work in temperature controlled areas. Protective clothing and gloves play an important part in protecting the health, safety and welfare of workers at low temperatures. See BMPA Guidance Note GN 1-28 on Thermal Comfort for more information. Selection of thermal protection must also take account of food hygiene requirements. In many workplaces appropriate thermal protection will be required and it is important to make sure it is suitable to be worn under the outer layer designed to protect the meat product from contamination.

The type of thermal protection required for visitors must be assessed on the basis of the temperature level and the exposure time. If it is decided that thermal protection is required by visitors it is important that a full range of sizes is provided. Examples of the protective clothing that would be suitable for work in chilled areas and freezers may be found in HSE publication HSG76 “Warehousing and storage: a guide to health and safety”.

### Hi Viz

Hi Viz vests or coats should be worn where there are vehicles and trucks operating both inside the plant and in all external areas. Some businesses put visitors into Hi Viz at the gate and require that it should be worn at all times whilst on site. However it should be remembered that Hi Viz should not be worn in animal areas. It is good practice to have a changing point provided with hooks and signage where Hi Viz garments can be exchanged for dark coats before entering animal areas.

### INFORMATION, INSTRUCTION AND TRAINING FOR EMPLOYEES

PPE is only effective if it is used correctly and properly maintained. The law requires employers to provide suitable and sufficient information, instruction, training and supervision to help employees meet these requirements. Where PPE is provided to visitors the same requirements apply.

### REFERENCES AND USEFUL CONTACTS

#### Health and Safety Executive

see [www.hse.gov.uk](http://www.hse.gov.uk) and <http://www.hse.gov.uk/toolbox/ppe.htm>

HSE Books: telephone 01787 881165 or see <http://books.hse.gov.uk/hse/public/home.jsf>

Note that many publications are now available to download free of charge from the HSE website.

HSE Publications:

- Personal Protective Equipment at Work (second edition) – reference L25 – HSE Books
- Personal Protective Equipment (PPE) at Work, a short guide – reference INDG174
- Respiratory Protective Equipment at work: a practical guide – reference HSG53
- Noise: don't lose your hearing – reference INDG363
- Controlling Noise at Work – Guidance on Regulations – reference LI08

#### British Standards Institute

BSI British Standards  
Customer Services  
389 Chiswick High Road  
London  
W4 4AL

Tel: 020 8996 9001 or see <http://shop.bsigroup.com>

## Driving with Hanging Loads (New Guidance Note November 2014)

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### UNSTABLE LOADS

There are many loads other than hanging loads that can be unstable, such as liquids which slosh up and down, steel tubes and bars which may slide forward into cabs, pallet loads etc. Many people, drivers and other road users, have been seriously injured or killed when loads have moved and directly hit them or caused the vehicle to roll over. However there have been many research papers produced covering these risks with subsequent advice for hauliers both in the UK and abroad by various organisations including the Department of Transport and the Health and Safety Laboratory. Unfortunately for the meat industry, hanging loads have not featured in most of the UK research. Some good material has been produced outside the UK including a very good paper by John de Pont of the Transport Engineering Research New Zealand Ltd.

### RISKS

The risks include roll-over at roundabouts, tight corners, cambers and hitting kerbs. Injuries have included fatalities to drivers and third parties.

Handling is affected by sideways swing, high centres of gravity and meat sliding forward or backward on the rails.

### RISK FACTORS

- The centre of gravity tends to be higher with a hanging load.
- Speed is also a contributory factor in vehicles overturning when carrying hanging loads that can swing during transportation, particularly at roundabouts or on a sharp bend or incline on the road
- Uneven loading of products resulting in more weight being placed on one side of the trailer than the other.
- Inconsistent loading that can leave hanging rails left empty, allowing the hanging load to swing. Loads should be tight, secured and evenly distributed.
- Some vehicles are slung lower, but most vehicles and trailers for meat have an insulated box on top of the original chassis which tends to make them quite high.
- Mixed loads: there are mainly two types of hanging loads - a single species load, which is usually taking a load from an abattoir to a boning plant and a mixed species load usually taking meat from a wholesaler to retail shops. Although mixed species vehicles are often smaller, they can have problems with weight distribution as different species vary in weight.
- Shunting: sometimes loads are moved around in wholesalers' yards using shunter tug units. These lift the trailer up in the air on the fifth wheel without the need to wind trailer legs up and down. This, of course, can result in loads rolling towards the back doors if they are not tight and secured.
- Speed, braking and accelerating while driving are all factors which can contribute to instability and subsequent roll-overs, particularly on bends and roundabouts.

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## CONTROLS

### Design

There are possible solutions by design which, if they do not eliminate the risks entirely, at least considerably reduce them. However, such innovations have not been generally taken up probably because few meat companies run their own transport these days, using hauliers instead. These controls could include:

- Height of vehicle: rather than perch the insulated box on top of a box chassis, it could be down between the wheels with an integrated body like a double decker cattle trailer.
- Cross beams: if packed tightly, loads are much more stable on lateral beams and rails rather than the usual longitude rails
- Longitude restraint: this would dampen the swing if fitted half way down the carcass and offset from the hanging rail, thus pushing the carcass out and stopping the lateral swing.

### Procedure

Loading: wherever possible loads should be full, thereby restricting movement. Smaller loads should be held tight with restraining bars. The length of a full load should also be broken up by lateral bars. As far as possible, weight should be evenly spread with particular attention given to mixed loads.

Loads must be checked after shunting to ensure they haven't moved backward.

Driving: there should be procedures for driving hanging loads and driver training specifically for hanging loads.

The driver should visually check before transporting that the load has been loaded safely and that the contents will be secure during transportation.

## REFERENCES

- Code of practice for Safety of Loads on Vehicles – Department of Transport
- Vehicle Load Security – HSL
- Stability Effects of Sloshing Liquids and Hanging Meat – Transport Engineering Research New Zealand Ltd.

## Safety When Handling Cattle in Slaughterhouses

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## INTRODUCTION

The purpose of this Guidance Note is to help those operating cattle slaughterhouses to identify where significant hazards may arise when handling live animals. It is not intended as a conclusive study and competent advice should always be sought.

Extensive research<sup>1</sup> shows that changes in cattle rearing methods, reduced human contact and the introduction of continental breeds have contributed to an increase in risk to personal safety when handling cattle at abattoirs. These up stream factors are largely beyond the control of the operators of commercial abattoirs. It could be argued that commercial operations could be more selective when buying animals. However these animals would still need slaughtering and would only be moved to other slaughterhouses. Changes in legislation have also affected risks, for example ear tag reading has become an additional handling requirement.

The investment in off-loading, lairage and handling systems can involve significant capital cost and many older systems are still used which have not been installed or modified with consideration to the changed risk. The balance between animal welfare and personal safety is sometimes compromised in favour of animal welfare, and human fatalities continue to occur at commercial slaughterhouses. Calm animals benefit both safety and welfare. This double benefit is cited as a reason for improving handling systems on-farm and for selective breeding towards calmer temperaments. The priority must always remain with human safety. Employers have a statutory obligation 'so far as is reasonably practicable' to control risks to the health and safety of their employees and other people who may be harmed by their operations. Abattoirs must reject animals which are likely to put people at an unreasonable level of risk. Where facilities are upgraded or replaced, these may incorporate features which address the change in handling risk, however many abattoirs have handling facilities which may be up to forty years old and may not be appropriate in some cases.

The evidence clearly shows that when animals are handled in a way which suits their normal behavioural characteristics, their behaviours are more predictable and the handling process is made safer and more efficient. Those in the industry will also confirm that there always remains a risk when handling live cattle given that the animals can weigh several hundred kilos; move very quickly when startled; are essentially unpredictable; jump approximately two metres almost from standing, and may also have horns. Even cattle which do not deliberately intend to cause injury to a handler should be viewed as a potential threat. Around half of the fatalities that occur on farms result from either, the handler slipping and accidentally being trodden by an animal, or an animal accidentally slipping and crushing a handler.

Ultimately, the risk of injury can only be prevented by separating cattle from people. The law requires that risks are assessed and reduced to a reasonable level where this is not achievable.





Abattoir workers handle many hundreds of animals each year and because of this some may become complacent about the risks associated with handling animals. Cattle, irrespective of age or size, have the potential to cause serious harm or worse. This risk is foreseeable and provision should be put in place to manage it.

The process flowchart is divided into four key areas;

#### **Pre-Arrival**

The exchange of information before the animal arrives can inform a number of decisions. The abattoir can decide whether they wish to receive the animal and if they do, they can ensure that the appropriate steps are taken to manage the animal when it arrives. All involved can then be prepared and are therefore less likely to be harmed. The person(s) supplying / delivering the animal owes a duty of care to those not employed by them to highlight any known problems with an animal.

#### *Useful information to collect includes;*

- Whether the animal is injured.
- Whether it is fractious.
- Whether it is distressed.
- Whether animals are segregated on the vehicle thus reducing the need to interact within groups of animals after unloading takes place. This more usually relates to gender segregation but could apply to age as well.

#### *Further considerations could include;*

- Is there a history of this 'supplier' delivering animals which have proven problematic to handle?
- Is there a history of this 'supplier' using a vehicle the design of which has created problems when off-loading in the past?
- Is there an unusual reason why the animal is being slaughtered? (sometimes animals are slaughtered because they have shown problematic behaviours in husbandry).
- In severe cases, is on-farm slaughter an option?

A system should be in place for ensuring that this information is collected at the point when the animals are booked in prior to their arrival. The information should then be cascaded to relevant personnel and in particular, those with nominated responsibilities for dealing with injured, fractious or distressed animals.

#### **Arrival**

Perimeter containment is a key control measure for minimising the risk from escaped animals. Whilst ever an animal is contained on site, the abattoir has greater control over achieving a satisfactory outcome to an escape incident. The provision and maintenance of suitable and sufficient perimeter containment should form part of the site control measures. Several legal cases are brought each year from members of the public being injured by cattle that escape onto roads. Poor perimeter containment therefore brings with it a risk of legal penalties.

When the animal arrives, interaction should take place between the vehicle driver and the person representing the abattoir at the off-loading point. If the communication system has worked correctly, the information obtained earlier should feature in this discussion. In addition, any new information should be provided by the driver which may include difficulties with the animal during loading or transportation.

The person representing the abattoir should have the authority or direct access to the authority for accepting or rejecting either the vehicle or the animal. If it is clear that the vehicle design or its state of repair is not conducive to achieving a safe off-load then a decision should be made about how this is dealt with. Rejecting the vehicle should be an option. There is a risk to any person lowering a tailboard that cattle can escape onto it while it is being lowered, and in so doing injure the person underneath. Wherever possible the tailboard should be lowered from the side, and/or using a mechanical means such as a hydraulic ram and/or using a rope to pull the catch open.

Similarly, if it is clear that an animal represents a significant risk in relation to the capacity of the off-loading facility and the capabilities of those staffing it, then the option of rejecting the animal should be available.

Where it is decided to off-load the animal, wherever possible this should take place without entering the vehicle load bay. The Official Veterinarian should have a safe location from which to conduct their ante-mortem inspection. Gates/barriers on off-loading facilities should be secured to the vehicle unless the way in which vehicle fit the off loading facility inherently prevents an animal escaping. In many locations delivery vehicles will come in an array of sizes and off-loading facilities should be so designed to accommodate this fact. An off loading facility designed to receive a lorry may not accommodate a four wheel drive with cattle trailer without adaptation. Such adaptation should be designed into the system and not left to creative thought, or chance, at the time of delivery. In some circumstances having separate off-loading facilities (one for lorries, the other for all other types of transport) might be the reasonably practicable solution. Structural failure or defect of a gate/barrier at this point will mean that the animal can escape. The person responsible for off-loading the vehicle should normally be the vehicle driver. They are more likely to be acquainted with the animal and its characteristics having been involved in its loading.

If segregation is required a site procedure should be instigated. This will involve trained personnel and all others should stand clear of the process within a safe location. At no point should one person be left alone handling the animals.

It may be worth highlighting that cattle find the processes of loading and unloading more stressful than the journey itself (as indicated by stress hormone profiles). Calm handling is essential to prevent them becoming even more agitated.

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### Lairage

The lairage is an area where humans and animals are in close proximity. Animal movements are likely to be rapid and common place and these have to be controlled. Only nominated personnel should work within this area and a restriction should be in place to prevent unauthorised access. The site should have clear rules on stocking density. A pen which is over crowded can create problems for animals and those handling them. Those most at risk within lairage are people unsupervised and unfamiliar with the site. Vehicle drivers should not normally need to enter the area beyond the off-loading point.

If the ante-mortem inspection requires that an animal be isolated or separated for further inspection or examination, the segregation procedure should be followed. Similarly, if an animal is too dirty to be processed normally, it is likely to require segregation under the application of a clean livestock assessment. It should be noted that dead clipping is the safer option when cattle need to be clipped, however the emphasis must be on clean cattle being presented for slaughter. Clipping of an animal will once again require segregation, and in this case close containment, as it would during ante-mortem examination. Suitable and sufficient facilities should be put in place to ensure that this is done safely. A crush providing access to both sides of the animal is almost essential. Injuries are common during belly clipping and a contributory factor is the need to stretch under an animal to reach a side that can't be accessed because the crush is up against a wall. The sides of the crush should open to allow easy access with a minimum number of points against which an arm can be trapped. Any use of a crush must be done with a good understanding of the way any particular type operates, as different designs may make a procedure safe in one type, but dangerous in another. As a general rule, crushes should be quiet. They vary greatly in how much noise they make and a stressed animal will become even more agitated when approaching and inside a noisy crush. If this is a problem with an existing crush, use can be made of rubber strips to prevent metal-to-metal contact.

Isolation of an animal is frequently easier and safer if a companion is allowed to join the animal in question. Stressed cattle are much calmer in the presence of another animal.

### Restraint/Stunning/Slaughter

Before stunning an animal it is imperative to ensure that the correct load is available in the gun and also the release area is clear. A missed or partial stun can result in an animal escaping within the slaughter hall. This can also arise during slaughter without pre-stunning. Where an animal escapes it should be regarded as an incident of serious and imminent danger. A procedure should be in place requiring only nominated personnel to become involved in re-containing the animal, with all other people moving to a place of safety. Some side gates of stun pens are hinged sufficiently low to make escape into the slaughterhall impossible. Sometimes carcasses need more assistance when being removed from the stun pen, but the chance of an escape into the slaughterhall is reduced to almost zero by having a low swinging door.

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### **The Impact of Environmental and Other Factors**

Lighting should be adequate to accommodate safe handling procedures. Adverse weather conditions could impact on off-loading procedures particularly if the area is not protected from the elements. In such cases personnel may be tempted to choose a location from which to work that is not suitable for purpose. Physical facilities should be subject to a planned maintenance regime, personal protective equipment should be provided and worn, procedures clearly understood and nominated personnel trained. All surfaces likely to become wet should have a non-slip surface.

### **BEHAVIOUR OF DOMESTIC CATTLE**

This section describes the factors which shape cattle behaviour. It is not about the basics of field of vision, balance points and droving, fight or flight responses, or herd instincts which are covered well in other texts.

As stated before, cattle behaviour is generally recognised as unpredictable. However, there are factors, which influence it and, once we are aware of them, help us foresee the chance of them being a risk to people.

#### **Background**

Domestic cattle have been created by selectively breeding from wild cattle for about 10,000 years. The qualities that are desired by humans have been exaggerated by heavy selection pressure applied in the process of domestication over this time.

The characteristics selected have been for draft work, milk, meat and sport in the case of bullfighting. Each of the groups selected for these purposes have had different requirements imposed upon them, and have formed the basis of 275 breeds as we know them today. However, the characteristics that are exaggerated in, for example, fighting bulls remain in other breeds.

#### **Behaviour**

Whilst difficult to rank intelligence in a meaningful way, it is known that cattle prefer to be in herds, protect their young fiercely, and have social hierarchies and good memories. They can be trained to find milking stalls, be ridden and pull implements. They will teach each other how to stand on a bank to avoid bloat, and dominant animals will push weaker animals to the edge of the herd, into the dairy first or through an electric fence.

They are sensitive to and have long memories for pain. Herds will run from warble flies from the first day of the season, cows will show reluctance to enter and have impaired milk let down in dairies with even small electric charges in the metalwork, and quickly learn what to expect in a TB test. The behaviour of a cow also tends to be adopted by her calves, due both to the direct inheritance of genes, and due to observational learning. Conversely they show signs of reduced arousal, or contentment, when listening to soft music and when trained, in the presence of quiet and calm people.

Cattle have strong self preservation instincts and once roused, will still pause to assess a situation. This short interval can be the only warning of an impending charge. Cattle do not typically charge unless they feel that no other option exists. A handler who is standing next to the only obvious exit from a pen is therefore at risk if the animal panics and this is a not uncommon cause of fatalities on farms.

They are not able to see colour well, but see light and shade to an exaggerated extent, compared to humans. It follows that they are not alarmed by bright colours, but are by light/dark contrast, such as shadows in a race, and by movement such as flapping material or arms. This can be used to cause cattle to balk if in flight, but equally can precipitate a charge if frightened. They also find sudden loud and unfamiliar noises frightening.

As many cattle are bred to have significant muscle mass they are strong and are able to accelerate and weave quickly. This agility and power is easy to underestimate. Care should also be taken to avoid standing excessively near to animals during movement as leg injuries can occur when kicked by an animal that has accidentally slipped.

#### Breed Influence

In the same way that it is not possible to predict individual human behaviour based on race, it is not possible to give an accurate indication of the behaviour of individual cattle based on breed. However, this doesn't prevent people making generalisations, which, on a practical level are useful as a guide, but cannot be relied upon as a predictor of an individual animal's behaviour.

In one experiment involving 450 cattle Temple Grandin evaluated the temperament of the following breeds, high being more flighty:

Mean temperament ranking	
<u>Bos indicus</u> -cross	3.46 +- .09
Tarentaise x Angus	2.36 +- .31
Other Bos Taurus	1.80 +- .10
Simmental x Red Angus	1.77 +- .07
Angus	1.70 +- .19

As a rule, within-breed differences between individuals are every bit as significant as between-breed differences. Only about 30% of the variation seen between animals of the same breed is due to their genes; the other 70% being accounted for by their experiences earlier in life. This emphasises how difficult it is to predict likely behaviour from knowledge of breeding and every animal should be taken at face value.

#### Sex Influence

As with breed influence, it is not possible to give an accurate indication of the behaviour of individual cattle based on sex.

However, generalisations go along the lines of all bulls are recognised as dangerous, and cows with calves at foot are a very close second. (The statistics on fatalities in the UK support this) Anecdotal evidence suggests that one of the contributory factors to cows being dangerous when having calves at foot is that their earlier temperament is a poor predictor of defensiveness when they become mothers. Apparently placid cows can become very defensive with little warning. Beef cows, then heifers and then steers are in the middle range, followed by mature dairy cows without calves, which are usually regarded as the most placid.

In the same experiment cited above, Temple Grandin went on to evaluate the temperament of a group of cattle based on their sex.

#### Mean temperament ranking

Gender	Observation 1	Observation 2
Heifers	3.72 +- .11	2.23 +- .10
Steers	3.39 +- .11	1.97 +- .10

#### Handling Influence

Whether or not cattle are trained to recognise people as dominant over them probably has the largest impact on their behaviour.

Adult cattle which have not been dominated by people since birth pose a large risk to handlers. This group includes range fed cattle, intensively reared cattle which are mechanically fed and strawed, and also 'pet' bulls, which have grown up to see people as part of their herd, rather than dominant over them. Injuries and fatalities have occurred when bulls 'turn' on a person they are familiar with; the reason behind this is that the bull sees the handler as competition in his herd, and sets about dominating the person.

At the other end of the spectrum, old dairy cows which have been handled many times by a compassionate but firm farmer generally pose little risk from attack, but can injure people by standing on their toes, and sometimes can kick. The quality of stockmanship has been shown to greatly affect livestock flightiness. An unpredictable handling style (sometimes aggressive, sometimes calm) is apparently worse than a persistently aggressive style. It has also been quantified that moving animals through a race takes less time when using a calm voice than when shouting and slapping. In the latter case, cattle tend to move in rapid bursts, which increases the likelihood of slipping, and takes more time overall.

#### Summary

Putting these aspects of cattle behaviour together, means that their actions can be accounted for in retrospect. However in general, but in the abattoir environment especially, it usually means that they must be regarded as unpredictable. Add to this their size and agility means that cattle must be managed as a serious hazard when not under control with physical barriers.

These barriers must also be well maintained. Numerous cases of serious injuries and fatalities occur each year on farms because of the failure of poorly secured barriers.

## GENERAL RISK ASSESSMENT FROM DELIVERY TO SLAUGHTER

### Delivery Vehicle Construction

Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Tailboard Springs	Lifting & handling injuries.	Weight of board. Adjustment of spring assisters.	<sup>2</sup>	Ensure only the driver/attendant operates the tailboard. Drivers/ attendants will be familiar with their vehicle.
Tailboard	Crush injury from animal standing on part lowered tailgate.	Lowering handle in centre. Weak side gates / no side gates restraining cattle. Unaware personnel.		Opening handle(s) to one side. Slide or side hinged tailgates. 3rd gate able to restrain animals while tailgate being lowered. Drivers aware of the risks.
Tailboard Flooring	Slips / falls.	Ability to easily unload animals (animals will refuse to move forward if the flooring doesn't feel safe to them).	<sup>3</sup> - Vehicles must have non-slip flooring throughout – including the tailboard.	Responsibly for deciding to enter the vehicle is with the driver / attendant. Off loading facilities should be designed to take advantage of animal's natural instincts.
Tailboard Side gates	Lifting & handling injuries.		Lateral projections must be provided to prevent animals escaping. Facilities must be of a sound construction.	Responsibly for offloading and correct use of side gates is with the driver/attendant. Weight – ability to move easily. Constructed to withstand the weight of the animals to prevent escaping whilst tailboard being lowered. Sufficient size to prevent animals from escaping.
Ramp Angles	Steep slopes. Slips / falls. Crush injuries from rushing / falling animals.	The ramp angle is largely dependant on the height of the off loading point.	<sup>3</sup> - The information below shows the maximum ramp angles allowed. It is possible to make a step up to 20cm to reduce the ramp angles although this is not recommended. <sup>4</sup> - Ramp angles for existing vehicles carrying cattle): External 29° Internal 33°. <sup>5</sup> - new vehicles built/on road after 5th January 2007): All Ramps - Cattle 26° Calves 20°.	Cattle should be allowed to walk off the vehicle by themselves. This will take longer, and unloading facilities would need to be increased to take this into account. The responsibly for entering the vehicle should only be with the driver/attendant, and only as a last resort. The loading area should be well lit, but not excessively bright, and should be as quiet as possible.
General construction Lighting	General dangers of working in the dark.		<sup>3</sup> - Appropriate lighting must be provided.	The responsibly for entering the vehicle should only be with the driver/attendant.
General construction Decks	Manual decks – physical lifting, stock security, ability to escape/jump off. Hydraulic decks - stock security.		Lifting platforms and upper floors must have suitable and strong barriers to prevent animals falling or escaping.	The responsibly for entering the vehicle should only be with the driver/attendant. A means of escaping should be provided.
Parking on unloading bay Alignment		Poor parking can lead to the elements highlighted above being ineffective putting both animal and human safety at risk. Additional equipment, such as gates provided on the unloading bay, can help to minimise any risks from poor parking.	Abattoirs are required to provide unloading areas/bays/dock which are enclosed on three sides. Vehicles must be constructed as above.	Abattoirs to ensure they have sufficient suitable facilities to enable drivers/ attendants to unload with the minimum of risk. Drivers/attendants to ensure vehicles are maintained in a good condition.
Abattoir unloading /lairage Unloading		Animals will refuse to move forward if there are items/people blocking the way. Risk to both animals and people if the passage to the pen is obstructed.		Abattoir personnel must ensure that the pen and passage to the pen is clear before the animals are unloaded.

Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Unloading-Handling Goads/Sticks		Animals will refuse to move forward if there are items/people blocking the way. Incorrect handling of goads can not only cause the animals to behave dangerously and be a threat to human safety, but also be a direct threat to human safety.	The transport regulations only allow goads to be used on the hindquarter muscles of adult bovines and then for a maximum of 1 second, and only when they have room ahead of them to move. Sticks must not be used to strike animals.	Suggest not allowing personnel to use goads or sticks, but if they must be used, on difficult animals, there use should be restricted to specific personnel –drivers or abattoir staff? Research on-farm has suggested that the unnecessary use of goads slows down movement through causing movement to become erratic rather than fluid.

### Lairage and Restraint

General	<p>Attacking animal. Struck by the head of an animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns.</p>	<p>Stressed animals are more difficult to manage and therefore will be more dangerous to handle. Continental breeds (e.g. Limousin) are known to be particularly excitable. Even animals which appear docile can suddenly react. Design of pens and gates unsuitable, e.g. too low. Note: Bent down top rails may indicate inadequate height to restrain animals.</p>	<p><sup>8</sup> - Suitable and sufficient information instruction training &amp; supervision. Provision of safe workplace. <sup>6</sup> - Risk assessment. Relevant and comprehensible training. <sup>11</sup> - Designers have a duty to design out hazards to users.</p>	<p>Human safety must always be the priority. When animals arrive abattoirs reserve the right to reject them if people might be put at unreasonable risk. Plan ahead. Ensure gates and routes are set correctly. Always be alert to the potential dangers. Never take previous calm behavior as a guarantee of safety. Keep a substantial structure between animals and people whenever possible. This must also be secured properly. Use of temporary measures, such as rope to secure gates, often results in injuries. Avoid standing in front and close to cattle. Always keep a safe distance behind cattle. Remember that cattle can also kick out sideways. If it is necessary to drove animals, keep a safe distance and ensure you have a way to escape close to hand. Apply knowledge of humane handling and the behavioral response of cattle to handling. Ensure that all staff are aware of the correct procedures to use. Training in animal behavior and handling techniques. Design of handling facilities to minimise risk of harm. Refer to TNS64 (SAC) TN 565 (SAC)</p>
Lairage	<p>Attacking animal. Struck by the head of an animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns.</p>	<p>Look critically at the animal handling facilities you have and how your staff use them. Consider how the animal perceives both your facilities and procedures. Walk through the system from the animal's perspective to identify fear-eliciting features. Look critically at the people employed. Does their understanding of welfare, safety and quality issues require improving? Have staff employed in the lairage and abattoir perceived that there may be a problem? If staff have perceived a problem, have they evaluated it?</p>	<p><sup>8</sup> - Safe access &amp; egress. Maintenance of workplace and equipment. <sup>3</sup> - Doors gates, etc Prevention of slips, trips, falls. <sup>7</sup> - Construction of suitable work equipment maintained in efficient state and good repair. <sup>11</sup> - Designers have a duty to design out hazards to users. <sup>4</sup> - Animals that have little or no room to move should not be subjected to coercion. Electric goads and prods should only be used in extreme cases and not on a routine basis to move animals. Goads and other aids should not be used repeatedly if the animal fails to respond or move.</p>	<p>Safer alternatives to physical contact should be applied. Suitable communications to enable employees to report concerns with management. Before making any changes to the physical characteristics of animal handling areas, ensure that the design incorporates principles which are known to encourage natural movement. Design to minimise the need for people to be in the same space as cattle.</p>



Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Movement into restraint	Attacking animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns.	Cattle can often be seen in pens or raceways staring at the alleyway ahead and refusing to move. This can be seen as the animal being stubborn, and can provoke goading. However, it usually indicates an 'obstruction' to the animal's forward movement which could be one or more of a number of visual (sight), auditory (sound) or, olfactory (smell) stimulants. The point of balance is at the animal's shoulder. All species of livestock will move forward if the handler stands behind the point of balance. They will back up if the handler stands in front of the point of balance. Many handlers make the mistake of standing in front of the point of balance while attempting to make an animal move forward in a race. Groups of cattle in a race will often move forward without coercion when the handler walks past the point of balance in the opposite direction of each animal in the race. Often tapping the side of the race can move them.	<p><sup>6</sup> - Risk assessment. Relevant and comprehensible training.</p> <p><sup>8</sup> - Safe access &amp; egress. Maintenance of workplace and equipment.</p> <p><sup>3</sup> - Doors gates, etc Prevention of slips, trips, falls.</p> <p><sup>11</sup> - Designers have a duty to design out hazards to users.</p> <p><sup>4</sup> - No person shall in any slaughterhouse, stun, or cause or permit to be stunned, any adult bovine animal unless at the time it is stunned it is confined in a stunning pen or in a restraining pen which (in either case) is in good working order.</p> <p><sup>4</sup> - Slaughterman to be ready before the animal is led into the box. Requires close co-ordination between the stockman moving the animal into the stunning box and the slaughtermen whose job it is to stun the animal.</p>	<p>Plan ahead. Ensure gates and routes are set correctly.</p> <p>Identify points within your animal handling system where cattle regularly stop and refuse to move forward, if only for a few seconds. For example, the use of a lighter colour paint on the side of a race in combination with better lighting are often all that is needed to help improve animal movement past a difficulty.</p> <p>If the animals are moving through the race by themselves, leave them alone – do not goad.</p>
Restraint	Design of restrainer. Struck by the head of an animal. Trapping.	The HSA recommend the fixed-shelf head restraining systems should be used wherever possible to improve shooting accuracy. Experiments with cattle demonstrated that a full width static front shelf allows fractious animals to climb the shelf at the front of the pen.	<p><sup>6</sup> - Risk assessment. Relevant and comprehensible training.</p> <p><sup>11</sup> - Designers have a duty to design out hazards to users.</p> <p><sup>4</sup> - Animals, which are stunned or killed by mechanical means applied to the head, shall be presented in such a position that the equipment can be applied and operated easily and accurately. The Minister may, however, in the case of cattle, authorise the use of appropriate means to restrain head movements.</p>	<p>Remove obstructions / structures which cause parts of the body to be trapped should the animal move.</p> <p>A hold down rail or rails is necessary to ensure adequate restraint when using this style of static head restrainer.</p> <p>A curved metal shelf takes up the space at the front of the pen preventing animals from lowering their heads. The dimensions of the shelf may need to be varied to fit the type of pen and particular notice is needed to ensure that the stunned animal does not get caught up in the front shelf and delay ejection.</p>
Stunning / kill	Attacking animal. Struck by the head of an animal. Crushing. Trapping. Trampling. Being knocked over/down. Kick. Horns. Captive bolt pistols.	<p>Ineffective stun.</p> <p>Animal may not go down at all, or if it does initially, it may get back to its feet.</p> <p>Animals let out of the stun box can move about causing danger. (see PREVENTION &amp; MANAGEMENT OF ESCAPED CATTLE)</p> <p>Uncoordinated reflex activity in stunned animals when shackling &amp; sticking.</p> <p>Unsafe handling of bolt gun can lead to penetrating injuries. Dropping a loaded gun will cause accidental firing. Guns can travel with high velocity over significant distances.</p>	<p><sup>6</sup> - Risk assessment. Relevant and comprehensible training.</p> <p><sup>8</sup> - Safe access &amp; egress. Maintenance of workplace and equipment.</p> <p><sup>11</sup> - Designers have a duty to design out hazards to users.</p> <p><sup>7</sup> - Correct weapon, correct ammunition, regular maintenance. Operative training. Use of gun/captive bolt in accordance with manufacturer's instructions.</p> <p><sup>10</sup> - Provide appropriate protective equipment.</p> <p><sup>10</sup> - A firearms certificate is not required however; operative licensing and training is required.</p> <p>For emergency use, suitable spare equipment and instruments for stunning, slaughter or killing are kept within the slaughterhouse.</p>	<p>Investigate all ineffective stuns</p> <p>Review the amount of post-stun kicking. Eg 0 = no activity 1 = Mild activity 2 = Moderate activity 3 = Severe activity</p> <p>Continual assessment of the animal should be made from stun to death.</p> <p>Keep a spare weapon available to re-stun.</p>

Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Electrical stun/kill	Electricity @600v AC	Ineffective stun. Animal may not go down at all, or if it does initially, it may get back on its feet and move about causing danger. Uncoordinated reflex activity in stunned animals when shackling & sticking.	<sup>9</sup> - Electrical systems to be maintained to be safe. <sup>6</sup> - Risk assessment. Relevant and comprehensible training. <sup>8</sup> - Safe access & egress. Maintenance of workplace and equipment.	Continual assessment of the animal should be made from the point of stunning through to death. Care should be taken with uncoordinated reflex activity in stunned animals. If stun appears ineffective the animal must be shot with a captive bolt gun and stuck.
Post-stun handling to facilitate bleeding	Cuts & stabs from hand knives. Kick. Trapped hand in shackle noose. Falling shackles.	Restricted space. Slip hazard (blood). Restricted access. Uncoordinated reflex activity in stunned animals when shackling & sticking. Employees may climb over animals which do not roll out properly due to poorly designed or maintained systems.	<sup>6</sup> - Risk assessment. Relevant and comprehensible training. <sup>8</sup> - Safe access & egress. Maintenance of workplace and equipment. <sup>3</sup> - Doors gates, etc Prevention of slips, falls. <sup>10</sup> - Provide appropriate protective equipment.	Trained knife users. Adequate space. Properly designed stun box and cradle. Correct hoist location. Maintenance of equipment and workplace.

### Prevention and Management of Cattle Escapes

Escaped animal incidents have the potential to cause serious injury or a fatality. Local procedures should be agreed in advance with the police. These procedures may require assistance being provided by the slaughterhouse. Where an animal escapes into a public place the local police should be contacted immediately as the animal is likely to be distressed and therefore could react aggressively. Local response procedures will vary but, in being contacted, the police can make their necessary operational decisions. In choosing not to call the police a slaughterhouse may unwittingly place themselves and the public at increased risk. The use of firearms is strictly regulated and a slaughterhouse should only use such equipment within the terms of their firearms / shotgun licence as to discharge a firearm in a public place without the authority of the police could render an individual or the organisation at risk of criminal charges being brought against them.

Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Escape off Site	Attacking animal. Struck by the head of an animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns. Traffic accidents. Potential fatality(s).	Inadequate perimeter fencing or cattle grid. Inadequate gates. Inadequate offloading facilities. Inadequate pens / rails - e.g. no secondary gates, low fences. Control of outside drivers not employed by the abattoir. Lack of supervision to ensure procedures are followed.	<sup>8</sup> - Control of risk to others. Keep lairage doors closed. Close internal gate behind cattle before moving vehicle. <sup>6</sup> - Risk assessment Safe handling procedures and training. Policy and emergency plan in case of escapes. <sup>11</sup> - Designers have a duty to design out hazards to users.	Keep lairage doors closed. Provide/use sheeted secondary gates when unloading with a pin in the floor to prevent it opening when cattle push past. Close internal gate behind cattle before moving vehicle. Good perimeter fence. Install a cattle grid at the site entrance. Contact the police and await their arrival. If the animal cannot be driven back safely it may need to be shot where it is. Where a marksman is available offer his services under police. Supervision. Note: the police often prefer this rather than using their own marksman who may be inexperienced in shooting large animals which become dangerous if wounded.

Area/Process	Hazard Description	Contributory Factors	Legislative requirements (where appropriate)	Good Practice
Escape into the yard	<p>Attacking animal. Struck by the head of an animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns. Traffic accidents. Potential fatalities. Persons at risk include those not experienced in animal handling.</p>	<p>Inadequate gates. Inadequate offloading facilities e.g. no secondary gates / low fences. Inadequate pens / rails. Animals which have attacked people are very likely to attack other people who approach them, even after a 'cooling off' period. Poor control of outside drivers, visitors and contractors e.g. MHS staff. Lack of training and supervision to ensure procedures are followed.</p>	<p><sup>8</sup> – Control of risk to employees and others. Keep lairage doors closed. Use sheeted secondary gates when unloaded. Close internal gate behind cattle before moving vehicle. <sup>6</sup> - Risk assessment.</p>	<p>If the animal is calm then let more cattle out and then drive them all together. If the animal is in a location where it can be safely observed and is not able to cause any risk to safety, it may be best to allow it to calm down for a time before attempting to retrieve it. If then animal cannot be moved and has to be killed <i>in situ</i>, where possible use a head shot with a captive bolt gun. A captive bolt gun with an extension handle is available for contact guns. These can be useful in situations like this as they give extra reach. In some situations it can be useful to have a rifle or shotgun available. If a beast has attacked or threatened to attack a person whilst escaped, no attempt should be made to move it. It should be shot by a marksman. A shotgun is a safer option than a rifle as it has a limited range. A single ball cartridge should be used rather than shot. A risk assessment, procedure for using the shotgun and a firearm certificate will be required. .OV to be informed if time available, permission does not need to be sought.</p>
Escape in the lairage:	<p>Attacking animal. Struck by the head of an animal. Crush injury (e.g. animal strikes gate). Trapping. Trampling. Being knocked over/down. Kick. Horns.</p>	<p>Inadequate gates. Inadequate pens / rails.</p>		<p>Keep lairage doors closed Man escape fences at entrance to race walkway to prevent animal access. In the lairage run more cattle with the escaped animal. Into the plant evacuate all personnel except two or three trained authorised people to deal with escapee. Pen walls/rails to be a minimum of 2m high. 1.8m is not sufficient.</p>
Escape out of the stunning box		<p>Ineffective interlocking allowing the gate into the stun box and the discharge gate to be open together. Cattle have been known to jump out of the box; by design a good deep, secure box will reduce this risk. However existing stunning boxes will vary and it may be necessary to fit a bar over the box. Care should be taken not to create an operative trap when fitting bars. More common is an animal getting up after it is released from the box due to a poor stun. Good stun box design can reduce the risk of a bad shot. The gun and shot used must be matched to the category of animal being slaughtered. Many abattoirs are killing both under thirty-month-old cattle, cows and stock bulls. It may be necessary to use a 0.25 side trigger gun for stock bulls. Poorly designed pens, gates and race e.g. low fences, blind corners, no roll out, no post escapes or bull fighter shields where required. Man walkway not fenced to prevent cattle entry. Personnel gates hinged to open wrong way (should close against stop to prevent animal access). No self close device.</p>	<p>Warning and evacuation procedure. Design of facilities to make use of behavioural characteristics of cattle. Adequate escapes. Safe handling procedures and training. Should an animal manage to get into the plant, evacuate all personnel except two or three trained and authorised people to deal with the escapee. A contingency plan is required for escapes into the slaughter hall. Gun and shot strength should be adequate for category of animal, particularly when slaughtering older cattle, cows and stock bulls.</p>	<p>Interlocking devices to prevent both openings on stun box being open at the same time. Restricting the size of the opening of the side gate will prevent live cattle being able to crawl underneath. Means of containing an animal if it escapes / ineffective stun E.g. - row of posts - gate that can be closed quickly - designing shackling area and bleed area on two levels - Bullfighter type shields in the shackle to provide safe place for personnel. The animal should be shot. An extended cap handle can be useful in this situation.</p>

## PROPOSED STEEL TUBE GRADES FOR CATTLE PENS

### Introduction

The diameter and thickness of the steel tube or structural hollow section to be used should be specified by the client (the purchaser, designer, supplier, component manufacturer, fabricator or erector, as applicable). A suitable corrosion protection should be applied to achieve the durability required. Any painting, coating or galvanizing should only be carried out after completion of all welding work.

### Steel Tube Grades

As a general guideline, it is recommended that low carbon (mild steel) material grades should be employed with specified minimum yield strength (SMYS) values of either 195N/mm<sup>2</sup> or 235N/mm<sup>2</sup>. Round, square or rectangular tubes or hollow sections can be used and these may be either hot finished or cold formed.

Appropriate steel tube or hollow section grades should be selected either from National (including European) or International Standards or alternatively suitable equivalent proprietary materials from a reputable tube manufacturer (such as Corus Tubes) may be used. Tubes and hollow sections in accordance with one of the following dimensional and tolerance standards in the table below will generally be suitable:

Material	Dimensional and Tolerance Standard	Material Grade
Circular, square or rectangular hollow sections	BS EN 10210-2	See Note below
	BS EN 10219 – 2	
	BS EN 10255	
	Proprietary Grades	e.g. Corus “Strongbox 235” e.g. Corus “Install” range.

Note: For reasons of formability (bending and shaping), weldability, galvanizing (and also availability and cost), it is recommended that material grades with an SMYS of either 195N/mm<sup>2</sup> or 235N/mm<sup>2</sup> are used. However, this does not preclude the use of higher strength materials, providing that the fabrication practices employed take this into consideration.

Where fabricated components are to be hot dipped galvanised, the purchaser must confirm with the material supplier that the steel composition is suitable. As a general guideline, this means that the silicon content of the steel should ideally either be  $\leq 0.05\%$  or in the range 0.15 – 0.25%.

### Material Certification

Materials used should, as a minimum, be subject to non-specific testing and inspection and supplied with a Test Report 2.2 in accordance with BS EN 10204 as standard.

### Weldability

Low carbon (mild steel) grades with an SMYS of either 195N/mm<sup>2</sup> or 235N/mm<sup>2</sup> are generally considered to be readily weldable in accordance with most standard welding methods. Welding guidelines can be found in BS EN 1011 Parts 1 and 2.

### Recommended dimensions for hollow sections and tubes

A non-exhaustive list of recommended material dimensions is given below, with a view to indicating those sizes most readily available.

Thickness (mm)	2.3 - 2.6	2.9 - 3.2	3.5 - 3.6	4.0	4.5	5.0
<b>CIRCULAR OD (mm)</b>						
21.3						
26.9						
33.7						
42.4						
48.3						
60.3						
76.1						
88.9						
114.3						
139.7						
<b>SQUARE Dimensions (mm)</b>						
25 x 25						
30 x 30						
40 x 40						
50 x 50						
60 x 60						
70 x 70						
80 x 80						
90 x 90						
100 x 100						
<b>RECTANGULAR Dimensions (mm)</b>						
50 x 25						
50 x 30						
60 x 40						
80 x 40						
90 x 50						
100 x 50						
100 x 60						
120 x 60						
120 x 80						

**NOTE:** Other sizes may be available depending on supply source.

#### Corrosion Protection

The corrosion protection employed should reflect the durability (life to first maintenance) required for the structure. It is recommended that components be suitably protected against corrosion, after completion of all fabrication work, by one or more of the following treatments:

- Hot dip galvanizing in accordance with BS EN ISO 1461.
- Thermal spray coating of zinc or aluminium in accordance with BS EN 22063.
- Organic powder coating in accordance with BS 1722-16.
- Painting in accordance with BS EN ISO 12944 Parts 1 to 8, as applicable, to meet durability requirement H.

Guidance on the appropriate protective coatings to use in specific environments and recommended minimum coating thicknesses can be found in BS EN ISO 14713. All loose scale, oil and dirt must be removed from the component surfaces before any protective treatment is applied.

Fabrications, produced from closed tubes or hollow sections, which are to be hot-dipped galvanized must be provided with drain holes of a suitable size.

#### Maintenance and Repair

**It is recommended that installations are inspected at regular intervals and that any damage found is investigated and suitably repaired.**

The corrosion protection should be inspected as part of the maintenance and repair procedure. Any damaged areas found can be repaired by a procedure acceptable to the client. For example, hot dip galvanized coatings can be repaired in accordance with the methods set out in BS EN ISO 1461 Clause 6.3. Options include, thermal spraying with zinc or a suitable zinc rich paint e.g. epoxy. The zinc content of a zinc rich paint should conform to BS 4652 (i.e. 80% in the dry film). The coating thickness in the repaired area should exceed that of the local galvanized coating layer. For guidance on suitable proprietary coating repair products and their application, reference should be made to The Galvanizer's Association web site [www.hdg.org.uk](http://www.hdg.org.uk).

**NOTE: Any additional fabrication work carried out following the application of the original corrosion protection will damage the original protective coating so this will have to be made good afterwards.**

#### Additional References

Additional guidance may be found in BS 5502 parts 21 and 22, and in the BS 1722 series of fencing standards, particularly Parts 8 and 12, in BS 5709 covering gates and stiles and in BS 4008 for cattle grids.

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## The Handling of livestock (New Guidance Note May 2015)

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An essential part of all livestock systems is the effective, safe and humane handling of animals.

During transport, at unloading and processing through to slaughter, animals are handled by unfamiliar stockmen in unfamiliar environments. Under these circumstances even normally calm animals can become stressed and agitated, making them more difficult to handle than usual.

The objective of humane animal handling is to move animals with minimum stress to both the animals and handler. Considerate handling reduces the risk to the animal of pain, injury and suffering. Unfamiliar surroundings, noisy and aggressive handling, and the proximity of unknown animals or people can cause even the calmest of animals to become difficult to handle and much more likely to cause injury to themselves, other animals or handlers.

Handling, especially by unfamiliar handlers, has the potential to be a highly stressful experience for animals. By working in a quiet, calm and considerate manner, handling can be carried out efficiently, with less effort and with less likelihood of the handler or the animals becoming stressed or injured.

From the perspective of the animal it is important to remember that some degree of stress may be almost inevitable in handling livestock, but the aim must be to keep this to a minimum. Factors that can dramatically raise the 'stress level' of the animal can include: - loud and excessive noise, unfamiliar surroundings, unfamiliar animals, hasty/driven movement from one location to another and close physical/violent contact with humans. Prolonged stress must be avoided in all circumstances. It can reduce the ability of the animal's immune system to fight diseases, especially in young animals. In some breeds of pigs, stress can lead to sudden death.

In slaughter animals, the physiological changes associated with stress can affect the quality of the meat. When an animal is handled and slaughtered humanely, there are low levels of lactic acid and high levels of energy left in the muscles. As such, the meat undergoes a number of reactions 'post mortem' which result in tender, good quality meat. If the animals are stressed prior to slaughter the post mortem changes are affected. Stress immediately prior to slaughter causes a rise in the lactic acid levels. This affects the muscles and they become pale, soft and exudative (watery), a condition known as PSE, which is most commonly found in badly handled pigs. In animals which are exposed to long-term stress (i.e. 24-48 hours prior to slaughter), muscle energy reserves are used up and this adversely affects meat quality by causing a condition known as dark, firm and dry meat, termed DFD. This occurs mainly in cattle exposed to difficult journeys. Both PSE and DFD conditions lower the value of the meat.

Animals have a natural tendency to move away from a person who enters what is known as their 'Flight Zone'. The 'flight zone' is a concept used to describe a circle of space around an animal which, when entered, causes the animal to move away from you. The size of the flight zone will depend on the breed of animal and its previous experience. For example, meat cattle and sheep, which are not used to being handled, tend to have much larger flight zones than pigs.

Knowledge of the flight zone helps when moving and controlling single animals or groups of animals. To move the animal forward, calmly step closer to the animal - into the flight zone. To stop the animal moving forward step back out of the flight zone.

If you enter the flight zone too fast, in a loud and aggressive manner, and get too close to the animal it will start to move quickly in an attempt to get away. If the way ahead is free, the animal is likely to charge forward. However, if it is not, or if the route forward is not clear, the animal may turn and run towards you raising the prospect of potential injury to the handler or the animal.

Therefore, when unloading animals ensure that the unloading gate is fully open, to provide the animals with an unobstructed way out of the vehicle, and then, calmly, walk up the side of the vehicles compartment, until you are at the rear of the group of animals. Then, steadily and calmly, move forward towards the open unloading gate. Pigs are naturally inquisitive animals and many will exit the vehicle, through the open unloading gate, of their own accord without any entry into their flight zone. Other, more reluctant, animals will move away from you, and towards the open unloading gate, as you enter their 'flight zone'.

Exactly the same principle should be applied when moving groups of animals from one pen to another, pre slaughter, opening the exit gate of the pen and using the sides of the pens to obtain a position at the rear of the group to be moved. A steady, controlled walking pace, coupled with spoken (not shouted) words of encouragement as you move the group of animals, utilising the 'flight zone' principle, towards the exit of the pen should result in most of them leaving the pen in a calm, unstressed, manner. If required, the selective, and judicious, use of 'clapping', or the rattling of a few stones in the bottom of a bucket, will generally persuade even the most reluctant of animals to follow the rest of the group out of the pen. Under no circumstances should the handler ever resort to the 'hitting', 'kicking', 'poking' or 'excessive shouting' to move the animals.

During the unloading process, and the holding/moving of animals in, and from, pens, keen observation of the animals needs to be maintained in order to identify any animals that are in a distress or injured state or are displaying 'welfare' issues. As well as the EC Regulation 1099/2009 on the Protection of Animals at the Time of Killing; Welfare at the Time of Killing (separate pieces of legislation for each home country of the UK), allowing undue, and inhumane, suffering to an animal is covered by several sets of legislation – most notably the Animal Welfare Act 2006 and the Welfare of Animals (Transport) Order 2006, which means that everyone involved with the handling of livestock has a responsibility for the wellbeing of the animals in their care.

## Safe use of Knives (Revised August 2016)

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This guidance is intended mainly for users of knives in slaughtering and meat processing plants, but the advice is relevant for butchery tasks. However, all tasks must be assessed and suitable controls implemented according to the hazard potential identified and the likelihood of injury identified. Because butchery in retail shops is generally carried out at a slower pace and because craft butchers tend to have very good knife skills, the risk rating is often considered to be much lower than in an industrial environment. The general rule in retail is that light trimming and cutting can be carried out reasonably safely in the front shop without industrial PPE, but for backshop boning operations where more force is used, full chain mail glove, arm guard and apron are normally worn.

### HAZARDS AND RISK

Traditionally knives caused a large number of accidents in the meat industry, but where good practice, training and suitable personal protective equipment has been introduced the incidents of knife injury are much lower. Where a knife is a necessary tool to carry out tasks then the hazard potential remains and the risk must be controlled. However, for some tasks it is not necessary to use an open bladed knife, for example packaging and strapping can be cut with an enclosed safety knife and separating sausages can be done with a pair of scissors.

The risks (and parts of the body at risk) vary from task to task and from business to business as layout and equipment vary. Some of the common the hazards to look out for are listed below, but employers and the self-employed must carry out their own assessment of risk so that adequate control measures can be provided.

#### Slaughter Processes

Here, knives are generally held in a sword or artisan grip rather than the more forceful dagger grip used in boning operations. Many tasks do not present a high non-knife hand risk as cutting is not towards the hand. More common injuries happen when the knife hand slips down onto the blade, and also cuts to the thighs on beef legging tasks.

#### *Boning operations - there are three methods employed here:*

- Traditionally in many retail operations each bone is removed individually. This requires considerable force to cut through joints.
- The second method, probably most common in factory operation, is cutting the carcass into primal cuts and then sheeting the bones out in one piece.
- Some boning plants employ mechanical boning systems which pull the meat from the bone as the operative cuts, reducing the force required.

All these methods involve risk of slicing cuts, stabs and slip down cuts. However, parts of the body at risk, and therefore protection required will vary according to the working position.

#### Slicing and Dicing

The main risk here is usually to the hands, to the non-knife hand and also to the knife hand when a slip down is caused through catching the edge of the table.

### **Injury Through Misuse of Knife**

Serious facial injuries including loss of sight have occurred when knives have been used to handle meat and when the knife has been kept in the hand while handling other items such as trays or boxes.

### **PRECAUTIONS**

**The single most important thing when working with a knife is that it must be sharp. A sharp knife goes where it is intended to go, whereas a blunt one slips and results in undue force being applied.**

Always select the right knife for the task. Deboning knives normally have a plastic handle that is designed to prevent fingers slipping onto the blade.

For sticking or other operations mainly involving pushing movements of the knife, the handle should have a suitable crossguard. See figure 1. The knife should be comfortable to grip, and it should have raised portions at the junctions of the handle and the blade to minimise the possibility of the knife hand sliding over the blade.

Knives should not be used when sharpening has reduced them to thin narrow blades that can pass through protective aprons or snap under pressure. See fig.2

Steels should have handle guards large enough to prevent cuts. Also available are 'ergo draw through steels', often preferred to a traditional steel as they require less skill to use. These should be fixed to a table or frame as they are not designed to be hand held.

### **SAFE STORAGE OF KNIVES**

Knife racks or other storage facilities should be provided, next to the work station. Scabbards should be provided if workers need to move around the workplace with knives. The scabbards should be divided into compartments and be easily dismantled for cleaning.

When not in use knives must never be left lying around.

### **SAFE DISPOSAL OF KNIVES**

Old knives should be collected in a securely sealed container with a 'letter box' type slot to put the knives through. This container can then be collected by an approved scrap collection service who have facilities to deal with them.

### **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Most injuries can be prevented if operators wear the right protective clothing, in particular protective aprons and gloves. All PPE must fit properly and be the right size for the wearer. If in doubt, seek advice from your supplier or the manufacturer.

### **Aprons**

Suitable protective aprons, usually chain mail or overlapping metal discs, must be worn during all deboning work or during other work where the knife is pulled with the point towards the body.

Picture courtesy of Cutting Edge Services Ltd.



*Figure 1: double edged sticking with anti slip guard*



Picture courtesy of Cutting Edge Services Ltd.

*Figure 2: a knife worn to the point where it would be unsafe to use*

The apron should cover the body area from mid breast bone to mid thigh. The weight should be borne by the wearer's shoulder and not their neck. The apron should be fully adjustable with shoulder straps and waist/hip belts so that it sits neatly against the body. The bib should not sag when the wearer bends forward.

Aprons should be properly maintained. Loose or missing links or discs should be replaced immediately and straps and fastenings should be kept in good condition.

“Stab pads” made of Balata belting or similar materials are not suitable as protection against stabbing injuries.

Aprons, trousers and vests should comply with the penetration test set out in BSEN ISO 13998:2003, *Protective Clothing-Aprons, trousers and vests protecting against cuts and stabs by hand knives*.

### **Aprons, Leggings and Upper Torso**

An apron with the lower half divided to form knee length leggings secured to each leg by straps should be worn by persons in abattoirs engaged in “legging out” (skinning of the leg) which involves holding the leg of the carcass between the thighs and drawing the knife towards oneself along the carcass shin bone. The danger is of stabbing, particularly in the thigh or abdomen. This type of protection may also be necessary for deboning hanging meat when the knife is brought down low. Tunics which cover the body and come right over the shoulder may also be needed when working on hanging meat at height.

### **Gloves**

A full chain mail glove should be worn on the non knife hand during deboning work. Chain mail gloves should comply with BS EN 1082 - 1:1997. Cut resistant gloves should be worn on the knife hand and on both hands when the knife is used in both hands, but never as an alternative to chain mail when chain mail can be worn.

### **Forearm Protectors**

Some gloves are designed to give wrist and forearm protection, but forearm protectors made of clear plastic and either attached to or independent of the gloves can also be obtained.

### **Footwear**

Boots or shoes must be non-slip. A slip or fall whilst holding a knife is potentially lethal. A dropped knife easily penetrates soft shoes.

See also [HSE leaflet L25, PPE at work guidance](#).

## **TRAINING**

All new employees must be given a thorough basic grounding in the use, care and maintenance of knives and other equipment including steels and scabbards. It is important to check whether a person is right or left handed before commencing instruction.

All new employees must also be given a thorough grounding in the dangers associated with the misuse of knives.

The use and maintenance of protective aprons, gloves and trousers should also be explained and attention should be drawn to the employee's obligation to wear such protective equipment.

Instruction should be given either by the foreman or an authorised training instructor. Whoever carries out the training must be satisfied that the employee has understood and absorbed all information supplied. The training should include grinding and steeling to full proficiency. An employer may choose to provide an internal or external service to sharpen knives rather than training all the staff to sharpen their own knives. Newly trained staff must be introduced gradually to full speed production. They must be carefully supervised until sufficiently skilled to work with safety at full production rates.

Children (under the statutory school-leaving age) MUST NOT be allowed to use, handle or clean knives. For young people between school leaving age and 18 years, a more detailed risk assessment is required taking into account their inexperience, and supervision by a competent person is also needed. See [The Management of Health and Safety at Work Management Regulations 1999](#).

### Training Courses

There is now a recommended level 1 qualification available from the Meat Training Council, 'The Certificate in Knife Skills for the Meat and Poultry Industry'. [Details available from here](#).

### WORKPLACE

Working areas must be clean and tidy. Working surfaces and surrounding floor areas in particular should be free of debris and production waste. Floors should be slip resistant.

Lighting levels should be sufficient to ensure good visibility.(500 lux minimum).

There should be enough space for each operator to work safely. Right and left handed people should not work with their knife hand on the same side unless there is additional space to prevent them cutting each other.

Working tables should be at the right height for the operator.

### FIRST AID

Most of the fatalities and serious injuries occur during deboning or similar operations. A serious stabbing injury can result in heavy external bleeding, particularly if a main artery is punctured. In a number of cases, the victim has bled to death in a few minutes. Prompt first aid action could save a life.

During deboning operations, someone should be available who knows how to deal with stab injuries and heavy bleeding. However, this should be backed up by training all staff in dealing with stab wounds and displaying an instructional sign. The first thing to do is to immediately apply firm pressure to the wound using a pad. Lay the victim down while continuing to press the wound. Call for help.

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## APPENDIX

### SAFETY WITH KNIVES: ADVICE TO USERS

1. Never use a blunt knife.
2. Know your own knife and how sharp it is.
3. Employ correct sharpening methods and learn the right way to use a sharpening equipment and steel.
4. Do not grind your knife blade to the extent that it becomes dangerously narrow.
5. Never use a steel that does not have a hand guard.
6. Always replace knives in the scabbard or steriliser when not in use. Never lay them down on a working surface where they may be covered by other objects.
7. Always pick up a knife by the handle.
8. Keep the working area as tidy and as dry as possible.
9. Never wear soft shoes. Keep a pair of non-slip safety/stout shoes for working. Slips and falls with a knife in the hand are potentially lethal.
10. Direct the knife away from the body whenever possible. Never cut towards your fingers, hand or an unprotected part of the body.
11. Keep all knives, steels and scabbards clean and sterilise them at the end of the working day.
12. Never carry a knife in the hand when away from the point of work, unless the blade is covered.
13. Never try to catch a falling knife.
14. Make full use of protective clothing that is provided, including gloves and aprons.
15. Get first aid treatment for ail cuts, however small. Septic cuts and scratches can be dangerous.
16. Never handle meat with a knife.
17. Never handle meat or any other items with the knife in your hand.

### REFERENCES:

PUWER , the Provision and Use of Workplace Equipment Regulations 1998  
The Personal Protective Equipment Regulations 2002  
The Management of Health and Safety at Work Regulations 2006



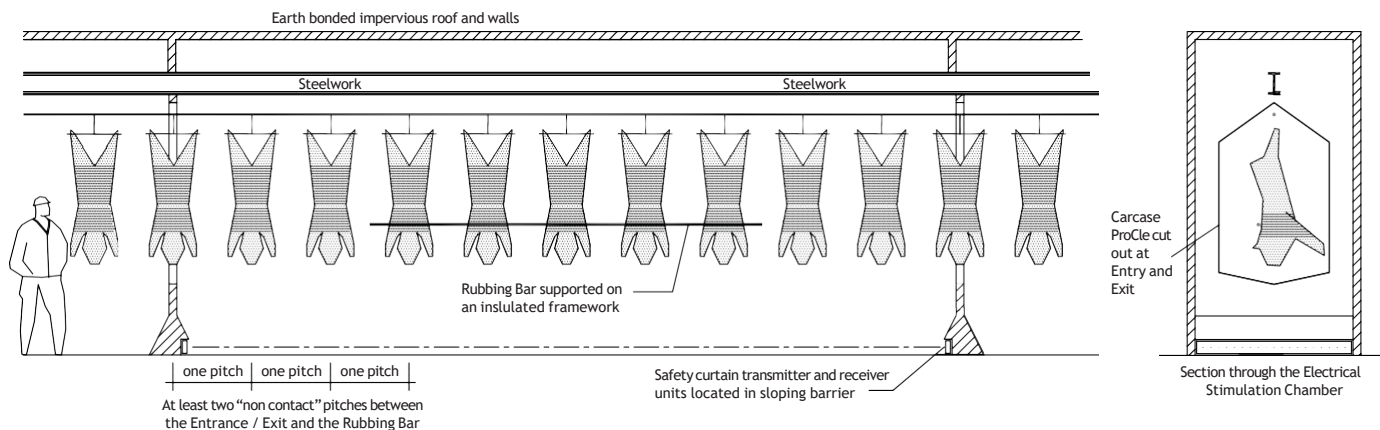
# High Voltage Electrical Stimulation Systems (HVES) (Revised August 2016)

## INTRODUCTION

This guidance note contains information and advice on preventing injury from electric shock and burns during use, maintenance and cleaning of High Voltage Electrical Stimulation (HVES) systems. HVES of carcasses uses voltages typically in the range 700 to 1100 volts AC for the prevention of cold shortening and tenderisation of meat. All existing systems have an exposed electrode that forms a rubbing bar along which the moving carcasses brush for about 90 seconds as they are carried along by an overhead conveyor. The high voltage current flows from the electrode through the carcass to the earthed conveyor.

The voltage and power available from the electrodes create a risk of electric shock and burns which may be fatal for anybody who may come into contact with it. The wet environment that exists in abattoirs will increase the risk of injury so it is important that no one can be “inside” or “enter” the hazardous area of the stimulator while the electrodes are live. This “exclusion zone” can be achieved by a combination of measures including enclosure of the equipment; personnel detection and trip devices; earthing, emergency stop controls and warning indicators supported by instruction and information.

## ENCLOSURE



Electrical Stimulation - Layout and Safety Considerations

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The HVES system must be installed within an enclosure (see figure and photo) that prevents anybody touching the live electrodes from outside and it must incorporate safety systems that cause the HVES system to shut down if personnel attempt to enter the enclosure.

To achieve this in practice the enclosure should have walls to ceiling height or 2.5 metres high, whichever is lower, and be roofed to prevent access from above and to prevent water from hoses or power washers making contact with the live conductors. Walls and roofs should be solid. All exposed conductive parts associated with the enclosure (including any metallic panels forming part of the structure), should be electrically bonded together and connected to the main earth terminal of the installation. Additionally, it is also a requirement, to run separate earths to the main building earth from the conveyor rail HVES entry and exit points in order to achieve the high level of safety required for this type of installation.

At the carcase exit and entry apertures there must be a barrier to let staff know that they are near a hazardous area and to dissuade them from entering. The barrier may be a ground level barrier (e.g. a rail or a 450 sloping threshold) and the opening for the carcase should be the minimum size necessary. There must also be warning lights to indicate the status of the stimulator.

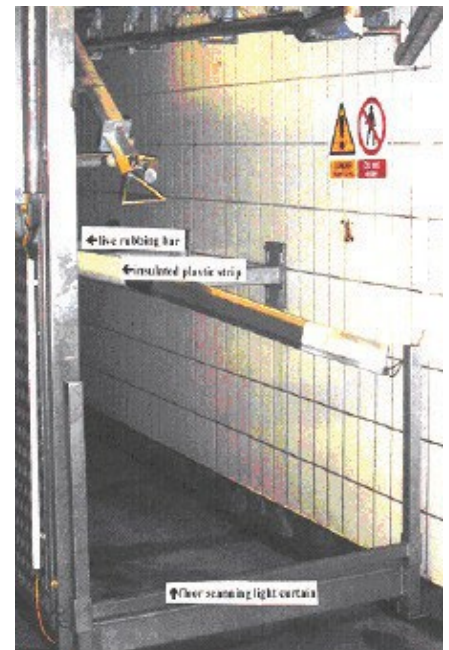
To prevent the possibility of people touching the live rubbing bar from the carcase entry and exit points, an adequate separation between the bar and the entry/exit points must be provided. There is also the possibility that carcasses being stimulated may become bunched on the overhead rail. Carcasses other than those being stimulated may then become live and create a hazard. Carcasses must be spaced by an indexer otherwise they can be pushed past the conveyer dogs. Taking these factors together, a minimum distance of 2 metres or 3 conveyor pitches, whichever is the greater, should be provided between the personnel barriers and the live parts of the rubbing bar. This distance may have to be increased for stimulation of cattle carcasses. The installer of the system should assess this.

If a separate and interlocked access door is provided for maintenance, cleaning, product recovery etc., opening of the door must immediately cause the HVES to be switched off, and restarting must only be possible by means of a start control located outside the hazardous area. Interlocking devices such as a captive key, an interlocking switch with guard locking, or dual positive and negative mode interlocking devices should be considered. Where practicable a window should be provided to allow staff and visitors to see the stimulation process without needing to enter the enclosure or stand where they might block the entry and exit points.

If there is any risk of water jets hitting the rubbing bar through the carcase entry and exit points, hoses should be relocated or screens installed. Alternatively, the water supply to hoses that could reach into the HVES must be automatically turned off when the HVES is in use.

#### **MINIMUM ELECTRICAL STANDARDS**

The electrical supply to the installation should conform with BS 7671:1992 Wiring Regulations 17th edition 2015 for electrical installations and the electrical parts of the stimulator itself should comply with BSEN 60204-1:2006+A1:2009 Safety of machinery - electrical equipment of machines Part 1 - specification for general requirements.



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## PERSONNEL DETECTION

If staff climb over, or through the physical barriers at the carcass entry and exit points their presence must be automatically detected and the HVES shut down immediately. This can be achieved by installing an Active Opto-Electronic Protection Device (AOPD) such as a light curtain. The preferred solution is to locate the light curtain so that it scans the entire floor area of the enclosure. This floor detection system does not rely on the operator to decide if it is safe to switch on. Every time the unit is switched on it will automatically check that the floor is clear of personnel or fallen carcasses and will prevent start-up of the stimulator if an obstruction is detected. This solution also ensures that no one can be present inside the enclosure when the system is operating.

Whichever method is used, automatic detection of personnel and/or obstructions is the main priority and must not rely solely on the HVES Operator or human intervention to achieve the required safety level. Any ledges or positions where personnel can remain undetected in the HVES area should be risk assessed and eliminated where practical.

It is not only essential, but also good practice, that whoever starts the system has a clear view of the entire stimulation area to ensure that no one is inside the area at start up.

Whichever system is used, the AOPD should comply with the requirements of BS EN 61496-2:2013 Safety of Machinery – electro-sensitive protective equipment. Part 1 General requirements and Part 2 Particular requirements: for equipment using active opto-electronic protective devices, or to an equivalent standard of performance. Guidance on the application of this standard is published by the HSE in guidance note [HSG180](#) Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery. Systems that are already in use and which use photoelectric safety systems to BS 6491 and which have an installation standard derived from HSE Guidance Note HSG180 Application of photo-electric safety systems to machinery will meet the required standard.

The degree of risk on HVES systems and the importance of the light curtains in achieving adequate risk reduction means that Type 4 light curtains (as defined in BS EN 61496-2:2013) should be used. These have 2 output switching devices that provide for 2-channel interfacing with the HVES control systems such that a single fault will not lead to the loss of the safety function. All HVES systems presently installed use electro-mechanical contactors as the primary control elements. In accordance with the guidance contained in [HSG180](#), these contactors should incorporate suitable means to monitor the 'on/off' positions of the main contacts configured in such a way that a failure of a contactor will be detected.

The safety-related parts of the HVES control systems should not rely on software, such as ladder logic, in Programmable Logic Controllers, (PLCs) for their operation, unless an approved Safety PLC is utilised with the maximum level of safety (SIL or Performance level), required by this type of system.

If the HVES is tripped by the AOPD, the HVES should only be capable of being restarted by a deliberate reset action. Reset switches must be located outside the HVES enclosure.

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### MAINTENANCE

The installation must be provided with means for ensuring positive electrical isolation for maintenance work. The installation must therefore have a power isolator or disconnector fitted which is capable of being locked in the off position.

An alternative system uses a captive key that is contained in a remote control box adjacent to the personnel door. The key must be used to open the personnel door and removing the key from the control box automatically shuts down and isolates the HVES system, providing a safe working environment.

It is highly advisable to enhance safety by providing facilities for earthing the electrode during maintenance and cleaning work. One manufacturer fits a lockable earthing bar that must be used each time anyone has to enter the stimulation enclosure. This is interlocked with the main control system to ensure that staff cannot operate the HVES unit with the earthing bar still in place.

### CONTROLS AND INDICATORS

All start and reset controls must be located outside the enclosure in an easily accessible position with a clear view of the inside of the stimulation area. An emergency stop control must be provided at the control panel and at the carcase entry/exit points to allow the HVES to be switched off in an emergency.

The control system should be protected from unauthorised use by means of a key operated switch with the key held by a competent person who has been trained in the operation of the stimulation unit.

To avoid confusion, the main warning lights at the entry and exit apertures should be very simple, green for “safe to enter” and red for “do not enter”. A set of lights should be provided at every possible personnel entry point.

It is very important that the interlocking devices are interfaced with the control system to maintain the overall integrity of the safety related sub-systems. The system should be designed and commissioned by a qualified engineer. It is not acceptable to allow persons who do not have sufficient knowledge of the system to commission it.

For cleaning purposes, and to allow production without stimulation, the conveyor should be able to run when the stimulation equipment is switched off.

### NOTICES

Warning notices should be placed at all possible personnel entry points warning of the dangers of electric shock including standard electrical hazard signs and giving instructions for personnel entry to the stimulator. Red and green lights should also have stop and go written on them.

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### INSTRUCTIONS, INFORMATION AND TRAINING

A full instruction manual should be provided with the equipment. This manual must include instructions on the safe installation, operation and cleaning of the HVES. Instructions on routine maintenance tests and examination of the HVES, its guards and protective devices, must also be included. Routine tests must include insulation resistance and earth continuity tests, as well as tests on the safety system such as the AOPD and interlocking devices. All operators must be given training on safe operation and cleaning of the HVES.

### USEFUL PUBLICATIONS

- 1 **Supplying New Machinery - HSE leaflet, INDG 270**
- 2 **Buying New Machinery - HSE leaflet, INDG 271**
- 3 **Approved Code of Practice and Guidance on the Provision and Use of Work Equipment Regulations 1998**  
**L22 HSE Books 1998 ISBN 0-7176-1626-6**
- 4 **Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery**  
**HSG180 ISBN 0-7176-1550-2**

### FURTHER INFORMATION

For further information please contact the Meat and Livestock Commercial Services Ltd or your Local Health and Safety Executive Office.

## Safeguarding against Possible Exposure to the BSE Agent in Abattoirs and Cutting Plants Killing and Processing over 30 month Old Cattle (April 2009)

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### BACKGROUND

The age at which cattle are tested for BSE surveillance purposes changed to 72 months on 1 July 2011, for cattle born in the United Kingdom (including the Channel Islands and the Isle of Man). This change will also apply to all healthy slaughtered cattle born in other European Union countries except Bulgaria and Romania. The age threshold for BSE testing of healthy slaughtered cattle born in Bulgaria or Romania or in non-EU countries will remain at 30 months.

It continues to be illegal to send cattle which were born or imported into the UK before 1 August 1996 to any slaughterhouse for human consumption.

Abattoirs wishing to slaughter cattle over 72 months of age (O72M) will have to comply with certain requirements and details are obtainable from the Food Standards Agency.

This means any abattoir wishing to slaughter O72M animals will have to produce a Required Method of Operation (RMOP) statement detailing how brain stem samples will be taken and tested prior to the carcass and its component parts being released on receipt of a negative test result. Cattle born or imported into the UK after 1 August 1996 should not have been exposed to feed contaminated in the UK and the incidence of BSE in these cattle is significantly lower than for those born or imported before August 1996. Cattle over 72 months of age are tested and any "positive" carcass will be removed from the food chain.

Any Cutting Plant engaged in removing the vertebral column that is SRM will also have to be approved and again it will have to produce an RMOP explaining how this operation will be carried out. Further details can be obtained from the Food Standards Agency.

### EXPOSURE

The main risk is splashing of broken skin or mucous membranes with materials containing the agent. These materials are classed as specified risk material (SRM) and the most important for potential exposure is:

- The Brain; and
- The Spinal Cord

Action must be taken to avoid cuts and to ensure the wearing of adequate Personal Protective Equipment (PPE). Exposure to contaminated equipment or clothing could also occur, so good hygiene practices are essential. For abattoirs slaughtering O72M cattle guidelines are available on brain stem sampling procedures. These are available from the Veterinary Laboratories Agency who can also provide training. Helpline: 0845 601 1367, or website: [http://vla.defra.gov.uk/services/docs/ser\\_fallen\\_stock\\_guidance.pdf](http://vla.defra.gov.uk/services/docs/ser_fallen_stock_guidance.pdf)

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## CONTROL MEASURES AND RISK ASSESSMENT

The company's own Risk Assessment may reveal that different controls are more appropriate and provide the same level of protection as those indicated here. If this is the case you are legally able to use the measures dictated by your risk assessment instead.

- 1. PPE appropriate for the task should be worn during all abattoir and cutting plant work:**
  - Overalls, protected by a waterproof apron or waterproof leggings;
  - Chain mail aprons and/or leggings should be worn where a risk assessment shows that there is a risk of stabbing or cutting injuries;
  - Impervious and washable boots;
  - Impervious gloves that cover hands and arms if exposed;
  - Protective clothing should be disposable, or if this is not practical must be washable, and stored separately from personal clothing. This protective clothing must be cleaned before storage;
  - When a risk assessment shows the need for face protection to avoid risks from splashing provision should be made for visors/face protection equipment to be cleaned as necessary during the working day.
  
- 2. Good hygiene**
  - Avoid hand-mouth or hand-eye contact while working;
  - Take rest breaks and meal breaks away from the main work area, after removing PPE, and any other contaminated clothing, in a separate, designated area;
  - Wash hands (and arms and face if necessary) and remove PPE before eating, drinking, smoking, using the telephone, taking medication, or touching contact lenses;
  - Cover all new and existing cuts and grazes with waterproof dressings and/or gloves before starting work. If cuts or grazes occur at work, wash immediately with anti-bacterial soap and running water and apply a waterproof dressing;
  
- 3. Ensure that skips used for disposal of carcasses are in good condition and do not leak.**
  
- 4. The delivery pressure of wash water should be as low as practicable consistent with hygiene needs but no more than 500 psi.**

The above information is correct at time of publication (July 2011), but legislation is constantly changing so please check with the BMPA to ensure you have the most up to date version.

## Pig Dressing Equipment Scald Tanks

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### DESCRIPTION

A scald tank is a tank, usually rectangular, filled with water at 60°C. The water is heated by steam, either directly or indirectly via a coil.

Pigs are immersed in the water in order to soften the hair prior to removal in the dehairer.

#### Manual

Here the pig is lowered into the water and it is propelled down the tank towards the dehairer cradle by operators using poles.

#### Automatic

Pigs are fed into the tank and pulled through, either by the continuation of the bleed conveyor, or by the pigs being de-shackled and pushed through by a conveyerised frame. Automatic tanks tend to be considerably longer than the manual type, in order to give the pigs sufficient dwell time (6 minutes). Another type is quite deep and the pigs are carried into the water by means of a rotary cradle device.

### HAZARDS

#### Manual

- Contact with steam piping
- Splashing by the hot water
- Steamy conditions
- With rapid fall entry systems there is a danger of operators being struck by carcase/shackle
- Contact with Zoonoses and/or pathogens

#### Automatic

- Entanglement or contact with in-feed conveyors, de-shackling devices etc
- Trapping by the discharge cradle.

### PRECAUTIONS

#### Manual/Automatic

1. Piping should be lagged.
2. In the case of direct heating, a steam control valve should be used to reduce the amount of steam bubbling to the surface. Special care is needed at the point where the pigs enter the water.
3. Area should have adequate ventilation and have a good standard of lighting and hygiene.
4. Only trained authorised operatives should be involved with operation.

#### Automatic

1. Only trained personnel involved in the operation should be in the vicinity of the tank.
2. Floor should be easy draining and floor drains must be kept clear.
3. Automatic lines should be enclosed.
4. All drive mechanisms should be guarded.
5. An emergency stop switch should be positioned in the automatic scald tank area at an operator position.



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6. The scald tank conveyor, and the in-feed and discharge mechanisms must be switched off and isolated, with the isolator locked, before operators try to dislodge or retrieve any carcase caught in the mechanism or any cleaning or maintenance work is attempted.
  7. On automatic lines, care must be taken at start up to ensure all personnel are clear of the system.
  8. On some machines the use of a propping device may be necessary to support the discharge cradle before anyone enters the tank.

## Pig Dressing Equipment Dehairers

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### DESCRIPTION

The machine comprises a metal box containing one or more shafts to which are attached beaters. These are pads in hard rubber or similar material to which are attached curved hardened steel plates.

The action of the rotating shafts and beaters removes the hair from scalded pigs.

The entry and exit of pigs is usually by means of manual or automatic cradles.

### HAZARDS

- Contact with rotating beaters and loading cradle.
- Steamy conditions due to adjacent scald tank.
- Hair and debris on floor.
- Gap between cradle, tank and fixed frame of machine.

### PRECAUTIONS

1. Machine should have flaps or similar guards on the rotating parts on the scald tank side and to prevent debris flying out on discharge side.
2. Automatic lines should be enclosed
3. Floors should be cleaned regularly of hair and other debris
4. Floor should be easy draining and the drains kept clear.
5. Only personnel involved in dehairing operation to be in vicinity of machine
6. Machine should only be loaded in accordance with manufacturers specification.
7. An identifiable stop switch should be positioned adjacent to the machine, preferably on the scald tank poling side.
8. Machine must be switched off, electrically isolated and locked-off before operators attempt to dislodge any carcass caught in the beaters and before any cleaning or maintenance work is attempted
9. If the machine is of the type that requires the shafts to be set wider to handle sows, the machine must be electrically isolated when this is done.
10. The machine should be electrically isolated when the gambrel table is removed.
11. The beaters should be inspected on a regular basis to check for cracks and loose or missing bolts/rivets.
12. There should be suitable guards in cradle movement area.
13. Scald tank poles must not be used to assist carcasses into or out of machine.

## Pig Dressing Equipment Gambrel Tables

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### DESCRIPTION

A table constructed of stainless steel or galvanised mild steel and situated at the discharge side of de-hairer and used for lifting sinews on pig hind legs for insertion of gambrel.

### HAZARDS

- Carcase falling from table
- Hair and debris on floor
- Knife used by hocking operator
- Trapping between gambrel and elevator
- Contact with Zoonoses and/or pathogens

### PRECAUTIONS

1. A retaining bar around the edge of the table, will prevent carcasses dropping onto floor or onto an operator's foot. This retaining bar needs to have an open section to enable the hocking/gambrelling operation to be carried out.
2. Floors should be cleaned regularly of hair and other debris
3. The table should be easily drained and moveable to assist cleaning of de-hairer and floor.
4. The table should be wide enough to prevent operator from reaching into de-hairer.
5. There should be a knife holder for the hocking operator.
6. Any gambrel return device should be located so as to minimise the risk of an operator being struck by gambrels.
7. On two man operations the gambrel operative should wear a forearm guard on the arm nearest to the hocking operator to protect forearm from contact with hocking operative's knife.

## Pig Dressing Equipment Automatic/Hand Operated Singers

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### DESCRIPTION

A vertical metal cylinder with a burner in the base, split vertically, and lined with firebrick. It is used to harden the skin for bacon production, to remove hair missed in de-hairer and to give the skin colour and depth.

### HAZARDS

- Open flame and lighting of the burner
- Hot surfaces
- Noise
- Trap on automatic machines between closing halves of the cylinder
- Steam

### PRECAUTIONS

1. Barriers to keep personnel away from the flame
2. A long torch to light the burner
3. Burner fuel storage located separately
4. Operators should ensure that water is turned on to cool the rail when singer is operating
5. Screening to cut down noise
6. Regular inspection of the rail and supporting steelwork for distortion etc. and a check that the water supply piping is clear of any obstructions that may affect water flow
7. In the case of a breakdown or a carcass falling, the singer should be allowed to cool down before any work is done

## Pig Dressing Equipment

### Black Scraper, Polisher and White (or Dry) Scraper

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#### DESCRIPTION

Carcases from the singler enter each of these three machines in turn. They remove marks or blemishes from the skin.

A black scraper has a water spray and moving metal scraper blades that remove the scorch marks.

A polisher is a similar machine containing rotary brushes or nylon claws that remove any hair or particles left on the pig carcass after the black scraper.

The white scraper blades remove particles of water and a thin layer of skin from the carcass.

#### HAZARDS

- The main danger is from entanglement or contact with drive mechanisms, blades and brushes etc.

#### PRECAUTIONS

1. The dangerous parts including drive mechanisms must be properly guarded.
2. There should be an emergency stop in the scraper/polisher area, at an operator position.
3. Machines must be switched off and isolated, with the isolator locked before maintenance, lubrication, changing of blades or brushes and cleaning of equipment.
4. Should a pig become dislodged from a gambrel, the machine must be switched off and isolated before the carcass is retrieved.

## Pig Dressing Equipment

### Hand held torch type Singers

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#### DESCRIPTION

Hand held gas torches used to remove carcase hair missed in de-hairer.

#### HAZARDS

- The danger from this equipment is the open flame

#### PRECAUTIONS

1. Operator must be properly trained.
2. It is important not to overlook the hazards associated with using a hand held burner.
3. The cylinder should be secured to a wall to prevent it falling over, and if kept outside the slaughterhall, a separate valve should be fitted in order to turn off the gas supply at the wall on the inside. If left ignited the burner must not be left near flammable material or where people could be burned.
4. Use of a flint gun is recommended to light the torch.
5. A stand should be provided to support the torch when not in use. Flame should be directed away from work point when the torch is on the stand.
6. Fuel storage must be located separately.
7. The operator should have adequate room for this task.

## Carcase Suspension and Falling Objects (New Guidance Note January 2013)

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### OVERVIEW

The safe operation of the modern meat plant requires that entire carcasses and dressed sides can be hoisted, transferred and lowered without endangering the operators or others working nearby. If we were manufacturing cars this would be easy as a lifting system could be designed to handle each identical car from the body shop to final assembly. However, the 'dis-assembly' line in a meat plant makes safe lifting more difficult as we are often lifting stunned kicking animals and then transferring the carcass from hook to hook as it progresses through the system. The strength of the suspension points can vary from carcass to carcass and the reliability of these suspension points can change as the dressing operations take place. The re-introduction of older cattle has increased the number of problems as the tendons and bones are often not as strong as in younger animals.

Each area within the plant has its own unique requirement for specialist lifting and with more and more job rotation schemes being used it is important that operators are made aware of the specific requirements of each area and trained to make decisions regarding safe carcass suspension. The following lists a number of operations within the plant and gives advice for the operator and maintenance staff.

### High level equipment

A meat plant is now a complex high tech environment and in order to keep the working areas clear of obstructions a lot of the ancillary equipment, control panels, hydraulic power packs, transformers, electrical stimulation units, power units, etc. is located at high level on the support steelwork. These items are often located above operator work stations and it is important that the installation and maintenance engineers are aware of the dangers of insecure equipment and the risk caused by maintenance equipment being left at high level "ready for next time".

The condition of all the lifting equipment – hoists, cables, bleed rollers, hooks, bleed rail, dressing rail, dressing rollers and equipment balancers – should be visually checked every day before work commences in addition to the regular detailed checks required by the insurance company and legislation. The equipment is subjected to high levels of water and regular chemical cleaning so it is important to check for any corrosion or any weakening of the support structure.

It is also important that the rail system provides a smooth surface for the rollers, any misalignment or step in the rail can cause a sudden drop resulting in the carcass falling from the hook.

### Shackling and Bleeding

It is vitally important that the shackle is located correctly on the rear leg and that any movement of the carcass tightens its hold rather than allowing it to slip off. Various types of shackle are available and the manufacturer will provide instructions for safe operation. For example, many accidents have been avoided by remembering that the shackle hook should always point towards the 'backside'. Always ensure that the shackle chain is correctly located so that it doesn't slide along the leg in the hope that it will 'catch' below the leg joint or hoof.

The bleed roller must have good contact with the bleed rail before the hoist is lowered and any worn or defective rollers should be removed from use and reported to the maintenance department.

Any post stun convulsions will mainly occur after stunning and prior to shackling but operators must be aware that additional convulsions can occur after hoisting as the carcass is being moved to the stun position. If these convulsions are violent it can cause the shackle to slip and the carcass to fall so it is important that all operators are aware of the dangers at this critical stage in the process.

The bleed shackle return system should be arranged to eliminate the risk of shackles falling when they become unstable after the carcass has been transferred to the dressing rail.

### Legging and transfer

The act of legging and transfer puts additional strain on the Achilles tendon as the carcass is transferred from the bleed rail to the dressing rail. The operator must take care not to cut into or damage the Achilles tendon as this provides the suspension point for the rest of the dressing line. If the operator has any concerns about using the tendon to support the side an alternative suspension point must be used or a safety strap fitted.

It has also been reported that electrical stunning and electrical stimulation can cause the tendons to weaken and snap, especially in older cattle.

### Hide Puller

The hide puller is capable of exerting considerable force on the dressing rollers and hooks but the amount of force varies with each type of hide puller. It is important that whatever type is used the carcass anchoring system is safe and will not exert undue strain on the hooks, the rail system or the support steelwork.

Some hide pullers incorporate a low voltage electrical immobilisation supply (to keep the back rigid) and this has resulted in problems with broken Achilles tendons. These problems have been solved by fitting an alternative earthing system so that the stimulation current does not pass through the Achilles.



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### Hip Suspension

Two systems are commonly being used to improve carcase quality – electrical stimulation and hip suspension. For many plants the installation of an electrical stimulation unit is not possible due to the high capital cost or the floor space required. The alternative method is to hip suspend the side prior to chilling and then return it the conventional Achilles suspension prior to butchery.

The original method was to insert a hook under the 'H' bone allowing the leg to fall to a horizontal position. It was soon discovered that if the splitting had been "off centre", the side with the 'thinner' bone could fall, often during chilling. The solution is to insert the hook just below the Ischium bone that has not been weakened by splitting. Although this bone provides a better more reliable suspension point, it is still important that the operator ensures correct positioning, if the hook is inserted in the sinew and muscle surrounding the Ischium it is likely that the side will fall as the weight is transferred onto the hook. After initial chilling the hip suspended side is often re-hung, using the Achilles tendon in order to present a more conventional shape for butchery. An alternative safety system was introduced by using a strap or rope around the side and over the hook, but this was time consuming and soon abandoned in favour of the Ischium suspension method.

### Reporting and Training

It is vitally important that all accidents relating to falling carcasses or objects are reported in order that corrective action can take place. One operator may be aware of the problem and be able to work around it, but a new operator may not be so lucky.

It is also important that operators are trained to recognise potential problems with faulty hooks, faulty equipment and weak carcase suspension points, especially on older cattle. Training must include the procedure to overcome these problems should they occur.

## Sheep Slaughter and Processing (New Guidance Note August 2013)

Although the processes are the same at all sheep plants there is much variation in the layout and number of stations depending on size and throughput. In slaughter knife cuts to the body are usually fairly infrequent; cuts tend to be to the hands and occasionally to the arms on higher level work. Some plants will have less machinery and do some of those tasks by hand. Hand held croppers used to be single control and most plants would have experienced finger amputations. However, this risk can be greatly reduced by ensuring these tools are dual control. Automatic croppers need to be carefully fenced to, as far as possible, prevent access, although they cannot be entirely enclosed as the cutters need to reach the carcasses. Pelt pullers also vary in design and like the one in the table below present little risk but there are still some older machines that pull the pelt between two rollers which can present a high risk. A lot of lamb is sold as whole carcasses, usually being loaded by hand with associated handling and slip risks. Because of the shape of lambs they do not lend themselves to the automatic cutting lines we see in pig plants, necessitating the use of table top bandsaws which, of course, risk serious injuries. Very small scribe saws are often used on butchery tables these days, but unlike band saws which will grab chain mail, chain mail can offer protection from these machines. Personal protective equipment for knife use will usually be up to standard in boning and cutting areas, but there has always been a reluctance to use chain mail in sheep slaughter because of gripping fleeces. However, some plants are managing this now with a good fit and a cotton glove under the chain mail, with the exception of legging and Y cut jobs.

**It is essential that all tasks are risk assessed and suitable controls devised individually at every plant due to all the variations but the following table may help in this process.**

**Note: NKH – Non knife hand; KH – Knife hand**

Task/station	Risks identified	Possible controls
General operative all departments 4 Lairage and slaughter	<ol style="list-style-type: none"> <li>1. Slips</li> <li>2. Foot injury</li> <li>3. Noise</li> <li>4. Zoonoses including zoonotic abortion, Q fever, Orff</li> </ol>	<ol style="list-style-type: none"> <li>1. Training/awareness</li> <li>1. &amp; 2. Toe tec anti-slip wellies</li> <li>3. Ear protection</li> <li>4. Good personal hygiene, gloves, exclude pregnant women</li> </ol>
Lairage	<ol style="list-style-type: none"> <li>1. Slips,</li> <li>2. Entrapment between sheep and pen rails</li> </ol>	<ol style="list-style-type: none"> <li>1. Floor surface housekeeping footwear</li> <li>2. Avoid handling in pens</li> </ol>
Trimming dirty fleece	Clipper/shearer cuts	Guarding, cut resistant gloves and training
Slaughter all operatives	Entanglement in main drives	Guarding and awareness through training
Stun (electric)	Electrocution	Condition of stunner, double insulation, RCD
Stun (conventional captive or pneumatic captive bolt gun)	Penetration injuries from gun	Training

Task/station	Risks identified	Possible controls
Shackle	Manual handling	Procedure and training
Stick	Knife cuts	Chain mail NKH, cut resistant KH Chain mail leggings
Shear	Shearer cuts	Pair of cut resistant gloves
De-head	1. WULDS 2. If manual knife cuts 3. Cropper	1. Job rotation, micro pause exercise 2. Chain mail long arm NKH, cut resistant KH. Chain mail leggings 3. Dual control
Breast strip tail removal	Knife cuts	Chain mail long arm NKH, cut resistant KH
Legging		
Socks		
Y-Cut	Knife cuts	Pair of cut resistant gloves because of grip issue
Breast roller	Entrapment	Procedure and training
Transfer to inverted suspension hanging from fore feet		
Remove hind feet	Knife cuts or cropper amputation	Dual control. Chain mail long arm NKH, cut resistant KH
Automatic foot cropper	Cuts, amputations possible	Fencing to prevent access to cutters
Punch automatic	Low WULD risk	Job rotation/training
Punch manual	WULDS	Job rotation/training
Rodding	WULDS	Job rotation/training
Pelt puller	No significant risk	
Insert gambrel into hind legs		
Re invert to suspend from hind legs		
Remove forefeet manual	Cropper amputation/knife cuts	Dual control, Chain mail long arm NKH, cut resistant KH
Automatic fore foot cropper	Cuts, amputations possible	Fencing to prevent access to cutters
Anus and Belly split	All knife cuts	Chain mail long arm NKH, cut resistant KH
Throat removal		
Throat trim		
Pluck removal		
Gut removal	WULDS	Job rotation/micro pause exercise

Task/station	Risks identified	Possible controls
Offal trimming Q.C trimming	All Knife cuts	Chain mail long arm NKH , cut resistant KH
Hand held splitting saw	Saw cuts	Dual control, exclude third parties
Inspection	Knife cuts	Chain mail NKH, cut resistant KH
High voltage stimulation	Electrocution	Automatic access prevention e.g. light curtain. Indexed feed to prevent contact via carcasses
Transfer from single hooks to four star carriers	1. Manual handling 2. Head injury	1. Procedure/training 2. Hard hats
Chiller operatives	1. Manual handling 2. Head injury	1. Procedure/training 2. Hard hats
Pre-inspection Breast tying Liver trimming Boning, cutting and trimming	All Knife cuts, hands, arm & body	Chain mail long arm NKH, cut resistant KH. Chain mail tunic
Scribe saws	Non saw hand cuts	Chain mail NKH, cut resistant KH
Band saw operators	1. Cuts/amputation 2. Head injury	1. Chain should not be worn, training to industry standard GN 2. Hard hat
Circular knife	Hand cuts	Pair of cut resistant gloves

**Further reading:****BMPA GN 4-10 Bandsaws****BMPA GN 1-39 WULDS****BMPA GN 1-8 Manual Handling****BMPA GN 3-9 Safe Use of Knives**

## Beef Slaughter and Processing (New Guidance Note July 2014)

The main difference between cattle and other species that are slaughtered, such as sheep and pigs, is, of course, size, which affects risk assessment throughout the process, from handling live animals, to lifting and handling carcasses and work station positions. Breed, gender and whether animals have been handled on the farm are also important factors at the 'live' end. Knife injuries are being reduced quickly as full chain mail protection is introduced (see [BMIPA GN 4-1 Safe Use of Knives](#)). Once a plant has implemented this standard of protection, the most frequent incidents tend to be falling objects, which includes animals, carcasses, sides, rollers, shackles and sections of rail, slips and falls, falls from height, animal kicks and manual handling. Work related upper limb disorders (see [BMIPA GN 2-8](#)) also feature among staff on the slaughter line but cases are much fewer in slaughter than in the other parts of the process such as boning, and retail packaging where more force tends to be used in knife work and tasks may be more repetitive.

For PPE standards see [BMIPA GN 2-6](#).

**It is essential that all tasks are risk assessed and suitable controls devised individually at every plant due to all the variations, but the following table may help in this process.**

**Note: NKH – non knife hand; KH – knife hand**

Task/station	Risks identified	Possible controls
General risks – <b>all tasks</b>	Slips and trips and foot injuries	Anti slip flooring and stands Anti slip steel toe footwear Good housekeeping? Clean as you go
	Head injury	Hard hats
	Zoonoses	For most conditions just good personal hygiene and impervious gloves Some conditions may require splash or respiratory protection (masks to EN149FFP3) (see <a href="#">BMIPA Booklet Animals and Your Health</a> )
	Fall from a height (all or some stations depending on design)	Platform rails and toe boards Fixed lanyards or fall arrest (see <a href="#">GN 2-7 Working at Height within the Meat Industry</a> )
	Noise	Noise reduction Ear protection
Stunning	Animals jumping up, hitting operative Animal hitting contact gun causing face injury or entrapment	Design of box and restraints
	Ingestion of splash	Visor

Task/station	Risks identified	Possible controls
Electrical stunning	Electrocution	<p>The electrical stun box must be designed and installed to ensure safe operation and prevent access to the danger area during the stun cycle by interlocked and/or fixed guarding. In addition to interlocks all maintenance and cleaning must be under isolation and lock out procedure. In the event of stun failure there must be quick safe access to a captive bolt stunner to minimise any animal welfare issues.</p> <p>Access to controls and immediate area must be restricted to one person during operation.</p> <p>Controls must be positioned so that the danger area cannot be reached during operation.</p> <p>No conductive tools to be in the area, e.g. metal paddles.</p> <p>If there is any risk of water jets contacting the equipment the hoses should be relocated or screens installed. Alternatively, the water supply to hoses that could reach the electrical stun box should be automatically turned off when the electrical stun box is in use.</p> <p>Be aware that this applies to hoses located within the slaughter hall and also located within the lairage.</p> <p><b>Testing and inspection of installed electrical systems to comply with the Electricity at Work Regulations 1989</b></p>
Shackle and hoist	Falling animals and shackles	Design (best if done on the cradle to avoid anyone being under hanging beasts). (See <a href="#">GN 4-5 Carcase Suspension and Falling Objects</a> ). Safe working procedure/training
	Kicks	
Sticking	Kicks	Training/method but again best done on cradle. Fore leg restraint
	Cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Low voltage stimulation	Electrocution (usually 90v)	Design, e.g. distance of power switch from animal/contacts
Rodding	Cuts	Chain mail glove and long arm on NKH. Cut resistant on KH
	Strains	Pneumatic rodding tool
On line clipping	Ingestion/inhalation of facial contamination and hair	Mask
	Cuts from clipper	Pair of cut resistant gloves
First leg	Knife cuts	Chain mail leggings and/or long arm (depending on height leg is presented) Pair of cut resistant gloves
	Amputation	Cropper to be dual control

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Second leg	Knife cuts	Chain mail leggings and/or long arm (depending on height leg is presented) Pair of cut resistant gloves
	Amputation	Cropper to be dual control
Leg transfer	None identified	
Flanking	Knife or flaymaster cuts	Pair of cut resistant gloves and arm guards. Chain mail tunic
Fronting	Knife or flaymaster cuts	Pair of cut resistant gloves and arm guards. Chain mail tunic
Front foot removal	Knife cuts if jointed	Pair of cut resistant gloves and arm guards. Chain mail tunic
	Amputation if cropped	Cropper to be dual control
Nose skinning	Knife cuts	Chain mail tunic
		Chain mail glove and long arm on NKH. Cut resistant on KH
Horn cropping	Amputation	Dual control of cropper
Ear removal	Knife cuts	Chain mail tunic
		Chain mail glove and long arm on NKH. Cut resistant on KH
Hide pulling	Knife or Flaymaster cuts	Chain mail tunic
		Chain mail glove and long arm on NKH. Cut resistant on KH
Bungs	Knife cuts	Chain mail tunic
		Chain mail glove and long arm on NKH. Cut resistant on KH
Head removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
	Repetitive strains	Design: hook over to head line
Brisket cut/saw	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
	Saw cuts low risk	Two hands required
Evisceration	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
	Ergonomic issues (handling/position)	Spreading tool
Pluck removal	Knife cuts	Chain mail tunic

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Task/station	Risks identified	Possible controls
Spinal cord removal	Knife cuts (not an issue if a machine is used)	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Forequarter trim	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Hindquarter trim	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Steam/vac	Burns low risk	Pair of rubber/vinyl type gloves
High voltage stimulation	Electrocution	Safe enclosure design Light curtain or pressure pads to prevent access. Note: a wet environment can cause problems with hygienic use of pressure pads. Spacing of carcasses and location of live rubbing bar with relation to entrance and exit (see <a href="#">GN 4-2 High Voltage Electrical Stimulation (HVES)</a> )
Hot boning preparation	Knife cuts	Chain mail tunic (may need long split leg) Chain mail glove and long arm on NKH. Cut resistant on KH
Hip suspension	Risk to third parties of falling carcasses/hooks	Hang on the Ischium, not through aitch bone Only hang suitable sides Check condition of hooks
Head boning	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Red offal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Green offal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Hide room	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
Chillers	Slip/falls	Anti slip flooring Good housekeeping? Clean as you go
	Handling (pushing) injury	Procedure and training
	Falling sides/objects	Anti slip steel toe footwear Hard hats Design, condition and maintenance of rail systems
Preparation for boning	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
	Saw cuts and third party risk	Design of saw station, dual control

Task/station	Risks identified	Possible controls
Boning	Knife cuts (parts of body exposed may vary for liberator or table boning)	Chain mail tunic (may need long split leg) Chain mail glove and long arm on NKH. Cut resistant on KH
	Liberator, risk of being struck by machine, bones etc.	Procedure (see <a href="#">GN 5-15 Mechanical Deboning Machine System</a> )
	WULDS	Knife sharpening, job rotation, micro pause exercise
Trimming	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant on KH
	WULDS	Knife sharpening, job rotation, micro pause exercise
Membrane machines	Machine cuts	Enclosure/interlocks on automatics
	Entrapment	Conductive glove safety system on manual machines (see <a href="#">GN 5-13 Derinders, Skinning and Membrane Machines</a> )
Dicing	Cuts, possible amputation	Enclosure/interlocks (see <a href="#">GN 5-5 Dicers and Cubers</a> )
Packaging	Work related upper limb disorders	Job rotation, micro pause exercises
	Knife cuts	Use safety knives
Vacuum and gas flush machines	Entrapment	Safety skirt or light curtain, check at start up (see <a href="#">GN 5-4 Gas Flushing</a> )
Palletizing	Handling injuries	Design, handling aids, manual handling training and job rotation (see <a href="#">GN 2-2 Manual Handling</a> )
	WULDS	

## Pork Slaughter and Processing (New Guidance Note May 2015)

As is the case with cattle - breed, gender and whether animals have been handled on the farm are important factors at the 'live' end of the operation. Some boars and sows can be more stubborn and aggressive than others, especially those of the Duroc breed who have a reputation for aggressive behaviour compared with other cross breeds. Also, experience has shown that pigs who have been raised in a controlled environment and are used to the presence of humans can be far more stubborn than their 'free range' cousins and, as powerful animals, can present more of a challenge to the stockman when trying to get them to go where they do not want to go. It is also important to bear in mind that, as a herd animal, an established group of pigs will not tolerate the presence of a 'stranger' animal in their pen and will attack it. Also any attempt to isolate an animal from the rest of its group will inevitably lead to a rapid escalation in the animal's stress level coupled with an increased risk of aggression on the part of the animal as it tries to return to its group.

In the past, knife injuries have been prevalent in the industry but these are now being reduced quickly as full chain mail protection is introduced (see [BMMPA GN 4-1](#) Safe use of knives). Once a plant has implemented this standard of protection, the most frequent incidents tend to be falling objects, primarily carcasses, slips and falls, falls from height, and manual handling. Work related upper limb disorders, (see [BMMPA GN 2-8](#)) also feature among staff on the slaughter line, but cases are much fewer in slaughter than in the other parts of the process, such as boning, and retail packaging where more force tends to be used in knife work and tasks may be more repetitive. For PPE standards see [BMMPA GN 2-6](#).

**It is essential that all tasks are risk assessed and suitable controls devised individually at every plant. The following table may help in this process.**

**Note: NKH – non knife hand; KH – knife hand; HH – hand held.**

Task/station	Risks identified	Possible controls
General risks – all tasks	Slips and trips and foot injuries	Anti-slip flooring and open grating platform floors Anti-slip steel toe footwear Good housekeeping? Clean as you go
	Head injury	Hard hats
	Exposure to zoonoses & pathogens	For most conditions good personal hygiene and impervious gloves (see <a href="#">BMMPA Booklet Animals and Your Health</a> )
	Fall from a height (all or some stations depending on design)	Platform rails and toe boards. Correct ergonomic workstation layout (see <a href="#">BMMPA GN 2-7 Working at Height</a> )
	Noise	Noise reduction Ear protection

Task/station	Risks identified	Possible controls
Lairage/Penning operations	Contact with multiple animals	Humane treatment of animals by lairage operatives in accordance with welfare of animals at the time of killing legislation. Safe working procedure/training
	Exposure to zoonoses & pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Stunning with CO <sub>2</sub>	Animals attempting to escape from animal in-feed run and in-feed pen, hitting operative	Design of infeed equipment and general layout Calm and controlled operator movements plus humane treatment of animals by operatives in accordance with welfare of animals at the time of killing legislation Gas stunning is only to be performed by welfare licenced operatives
	Exposure to CO <sub>2</sub>	Safety gas monitors and auto shutdowns
Electrical stunning	Electrocution	The electrical stun tongs must be designed and installed to ensure safe operation during the stunning operation. The use of electrical stunning tongs is a two handed operation and the tongs are designed to only pass an electric current between the two electrodes in order to render the animal unconscious. Therefore, if correctly installed, even direct contact with the pig during the electrical stunning operation will not pass any electricity to the operative. Electric stunning tongs are only to be used by welfare licenced operatives. In addition to interlocks, all maintenance and cleaning must be done under isolation and lock out procedures. In the event of stun failure there must be quick safe access to a captive bolt stunner to minimise any animal welfare issues
		Access to controls and immediate area must be restricted to one person during operation
	Contact with convulsing animal	Work area designed to allow operative sufficient space to stand clear of convulsing animal
Shackle and hoist	Falling animals and shackles	Design of area. Shackle supply return rail to contain 'speed dampers' to reduce velocity of shackles being returned to the operative Shackling is only to be performed by welfare licenced operatives
	Kicks	Safe working procedure/training
Use of Captive Bolt Gun	Contact with captive bolt	Utilisation of captive bolt gun is only to be performed by welfare licenced operatives
	Contact with explosive charge	Cartridges to be kept secure and dry in separate container from captive bolt gun and are to be accounted for at start and end of each shift
	Kicks	Safe working procedure/training/experience

Task/station	Risks identified	Possible controls
Sticking	Kicks	Sticking operation is only to be performed by welfare licenced operatives
	Cuts	Chain mail gauntlet on NKH. Cut resistant glove on KH
Bleeding	Ingestion/inhalation of blood	Mask Safe working procedure/training/experience
Scalding and de-hairing of carcass	Contact with hot water or steam	Scald tank water temperature to be around 60° as recommended by the FSA in the Meat Industry Guidance notes. No significant risk. Scalding steam in 'Steam Tunnel' operation. Access to area to be controlled and interlocked to ensure access is impossible during operation
	Zoonosis and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
	Contact with machinery	Safety interlocks. Fixed guards, machinery to be only operated by authorised/fully trained operatives. Control panel to be fitted with castellated keys wherever possible
Gambrelling	Knife cuts	Chain mail gauntlet on NKH. Cut resistant glove on KH Cut resistant apron
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Hanging on elevated line	Knife cuts to forearm	Forearm protection on side nearest to gambrelling operative
	Repetitive strains	Job rotation
	Contact with gambrel	Safe working procedure/training/experience
	Repetitive strains	Job rotation
Singe	Burns	Automatic process. No human access to area whilst in process
Wet & dry Polish	Contact with whippers	Automatic process. No human access to area whilst in process
Testicle removal & aitch split	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures

Task/station	Risks identified	Possible controls
Stick wound removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Breast bone split circular saw	Contact with saw blade	Forearm protector on NKH arm. Saw on counterbalance. Saw to be fitted with two handed operation and Auto stop on release of hand control
	Flying particles in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Breast bone split manual knife	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Bung release and abdominal open	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Gut removal	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures

Task/station	Risks identified	Possible controls
Green offal harvesting	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Pluck removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Red offal harvesting	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Kidney pop	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Carcass split auto saw	Contact with saw blade	Automatic process. No human access to area whilst in process Access to danger area restricted by barrier
	Contact with ejected material	No human access to or near area whilst in process
Carcass split manual saw	Contact with saw blade	Two hands required to operate saw. Area restricted to main operative during operation
	Ergonomic issues (handling/position)	Saw suspended from counterbalance
	Ejected materials in eyes	Goggles worn during operation
	Repetitive strains	Job rotation
	Exposure to Zoonosis and Pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures

Task/station	Risks identified	Possible controls
FSA inspection & trim	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
	Exposure to zoonoses and pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
Head drop	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Spinal cord removal	Ingestion of spinal material	Safe working procedure/training/experience. Adherence to correct hygiene procedures
	Exposure to Zoonosis and Pathogens	Safe working procedure/training/experience. Adherence to correct hygiene procedures
	Repetitive strains	Job rotation
Kidney removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Flare fat removal	Repetitive strains	Job rotation
Neck trim	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Skirt removal rotary knife	Contact with rotating blade	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Skirt removal with knife.	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Tonsil removal with rotary knife	Contact with rotating blade	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation



Task/station	Risks identified	Possible controls
Tonsil removal with knife	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Tenderloin removal with rotary knife	Contact with rotating blade	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Tenderloin removal with knife	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Tenderloin trim	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Carcass to chiller	Contact with hanging carcasses	Safe working procedure/training/experience
Carcass from chiller	Contact with hanging carcasses	Safe working procedure/training/experience
Head & foot removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Contact with pneumatic hock cutter jaws	Two handed operation of hock cutter. Equipment suspended from counterbalance
	Repetitive strains	Job rotation
Carcass removal from gambrel	Handling injury	Design, condition and maintenance of rail systems Safe working procedure/training/experience
	Falling sides/objects	Safe working procedure/training/experience Anti-slip steel toe footwear Hard hats
	Repetitive strains	Job rotation
Jowl removal with knife	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on NH
	Repetitive strains	Job rotation

Task/station	Risks identified	Possible controls
Foot removal with circular saw	Contact with circular saw blade	2 handed operation Safe working procedure/training/experience
	Repetitive strains	Job rotation
Tail removal	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on NH
	Repetitive strains	Job rotation
Trim flank	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on NH
	Repetitive strains	Job rotation
Leg removal with fixed circular saw	Contact with circular saw blade	2 handed operation lining up carcass with Laser guide light Conveyor takes carcass into saw
	Ejected materials in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
Hang primal leg	Contact with meat spike	Safe working procedure/training/experience
	Repetitive strains	Job rotation
Shoulder removal with fixed circular saw	Contact with circular saw blade	2 handed operation lining up carcass with Laser guide light Conveyor takes carcass into saw
	Ejected materials in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
Hang primal shoulder	Contact with meat spike	Safe working procedure/training/experience
	Repetitive strain	Job rotation
Wing rib split with HH circular saw	Contact with saw blade	2 handed operation. Saw on counterbalance. Auto stop on release of trigger / handles
	Flying particles in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
Remove tail root with knife	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation

Task/station	Risks identified	Possible controls
Chine bone removal with HH auto saw	Contact with saw blade	2 handed operation. Saw on counterbalance. Auto stop on release of trigger / handles
	Flying particles in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
Belly/loin split with fixed circular saw	Contact with circular saw blade	2 handed operation. Conveyor takes carcase into saw
	Flying particles in eyes	Goggles for eye protection
	Repetitive strains	Job rotation
Hang primals	Contact with meat spike	Safe working procedure/training/experience
	Repetitive strains	Job rotation
Jowl de-rind with auto de-rinder	Contact with de-rinder blade	Enclosed. Operative unable to access
	Repetitive strains	Job rotation
Trim jowl	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Job rotation
Hanging primals to boning lines	Contact with hanging primals	Safe working procedure/training/experience
Chump removal with band saw	Contact with band saw blade	Safe working procedure/training/experience A height-adjustable, fixed protective rail
	Contact with moving/rotating drive wheels	Closed machine casing with electrical interlocking doors
	Contact with ejected materials	Goggles provided
	Repetitive strains	Job rotation
	Saw cuts and third party risk	Equipment positioned away from pedestrian routes, behind barrier or in "No Unauthorised Access" area

Task/station	Risks identified	Possible controls
De-rind with open topped de-rinder	Contact with de-rinder blade	Use of operator worn closed loop operation (CLO) safety system. Machine is shut down the moment an operative's skin makes contact with any part of it. Alternative being specialised de-rinder gloves
	Contact with rotating equipment (drawing in)	Use of de-rinder safety gloves attached to CLO
	Repetitive strains	Job rotation
	Third party risk of contact with tooth/conveyor roll or blade	Equipment positioned away from pedestrian routes, behind barrier or in "No Unauthorised Access" area
Boning/ trimming	Knife cuts	Chain mail tunic Chain mail glove and long arm on NKH. Cut resistant glove on KH
	Repetitive strains	Knife sharpening, job rotation, micro pause exercise
Cut ribs, shoulder blades, neck bones with band saw	Contact with band saw blade	Safe working procedure/training/experience A height-adjustable, fixed protective rail
	Contact with moving/rotating drive wheels	Closed machine casing with electrical interlocking doors
	Contact with ejected materials	Goggles provided
	Repetitive strains	Job rotation
	Saw cuts and third party risk	Equipment positioned away from pedestrian routes, behind barrier or in "No Unauthorised Access" area

## Bandsaws used for cutting frozen and fresh meat (Revised January 2017)

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### DESCRIPTION

Bandsaws, particularly those with part of the blade exposed, can pose a high risk of injury if not installed and used correctly.

This guidance note aims to guide readers in assessing:

1. Whether or not an open manually fed bandsaw is appropriate for the task required.
2. The criteria for selecting equipment.
3. The specific safety issues identified in the procurement, installation and use of the bandsaw.

Although these machines are basically the same as they were when first introduced for use in butchery work, the jobs they are used for have changed with customer demands. They come in different sizes, but are all basically a continuous flexible blade driven around two wheels and passing through a table or roller bed. Bandsaws cut frozen meat very efficiently and are much safer doing this work than cutting fresh meat which tends to drag. There are different issues to consider between wholesale/factory processing use and retail shop use.

### HAZARDS

Contact with the blade during cutting or removing product is the greatest hazard and the most common cause of accidents. Injuries are usually cuts to fingers and do sometimes include amputation of fingers and thumbs.

### SELECTION OF MACHINES

It is most preferable to use another method of cutting the product, but where this has been assessed and deemed inappropriate, consideration must be given to the work being carried out. The main consideration will often be the volume to be processed.

#### Large wholesale cutting plants

##### Advantages:

- Large volumes may make expensive alternatives to bandsaws (e.g. enclosed slicers) viable for some tasks. Automated feed systems can remove the need for operators to have access to the blade altogether.
- There is a device available now which senses the operative and stops the saw in 15 milliseconds on contact. Unfortunately, machines fitted with this type of can be very high cost, but they have proved to be cost effective for high volume operations.

##### Disadvantages:

- High volumes necessitate using bandsaws for jobs such as cutting half legs and shoulders of fresh lamb.
- Speed required/line pressure.
- Customer demand for products that required bandsaw cutting.

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**Retail and other low volume operations.**

**Advantages:**

- Tasks such as the half joint mentioned, but this could be carried out by hand using a knife and hand saw if only small quantities were need.

**Disadvantages:**

- Small businesses could not justify other expensive equipment to reduce or eliminate bandsaw use. The blade stopping device would also be too expensive for most businesses.
- The machine most commonly found in a small butchery operation is a small basic type and not very powerful, which can lead to trying to force product through it.

**CRITERIA TO BE CONSIDERED IN THE SELECTION OF OPEN BLADE MANUALLY FED BANDSAWS**

- Size of machine: if it does not have enough power for the task, the operator will use force to feed it.
- Guarding: adjustable blade guard, interlocked top and bottom doors.
- Controls: to be positioned to face the operator, depending on whether the task requires the operator to face the blade or the side. Emergency stop should be large and easily operated by the knee or foot, a press to go foot pedal is best as the machine then stops as soon as the operator takes his/her foot off.
- Table top: depending on task, these can be fixed, with a rolling table on the left of the blade (used with a slice back plate and jig for slicing) or with a full rolling table used for sides of pork and other large items.

**Positioning:**

- Depending on layout of premises the best position for the operator is with their back to a wall to avoid knocks
- Open sides must be fenced to prevent the operator being knocked by third parties or trucks.
- Sawn product should be taken from the table by the operator pushing one piece with the next avoiding reaching past the blade or using a third party to take the product off. The saw should be positioned so that a bin or conveyer catches the pieces as they fall off the table.

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## PRECAUTIONS

The first consideration is to make sure that a bandsaw is not used where another machine or process will do.

Certain high risk operations should not be carried out with an open bladed bandsaw.

These are:

1. The cutting of fresh meat that necessitates approach of the fingers to the blade less than 50mm is too hazardous to be permitted.
2. Trimming of butt ends of lamb carcasses (that is, trimming off the thick fatty ends of the breast).
3. Preparation of fresh pork chops from loin of pork.
4. Cutting cooked chickens in half by hand feeding.

## CUTTING FRESH HALF LEGS AND HALF SHOULDERS

For this task when smaller quantities are to be cut, for example, in a retail shop, the meat can be cut with a knife and then the bone with a hand saw. However, this does not provide a practical solution for high volumes being processed in factories. Bandsaws cut better the harder the product is. 'Sloppy' fresh product may drag and cause entanglement. Therefore, if fresh legs and shoulders are to be cut on a bandsaw, they should first be chilled down to be as firm as possible. Shoulders should be presented thick end first.

**Never cut legs and shoulders on a bandsaw from fresh killed carcasses.**

## CUTTING FRESH LOINS OF PORK AND LAMB INTO CHOPS

Fortunately, there are other methods available for these tasks, so bandsaws should not be used. For small volumes, a knife and cleaver may be used. For larger volumes, slicing machines are available at a reasonable cost.

### Other employer/management precautions and points to consider

- Enough power and a sharp blade will avoid forcing and drag.
- Product should be firm. Fresh killed meat should be adequately chilled down before cutting.
- Stopping time, a brake will reduce this but not quickly enough to prevent injury.
- Saws can be operated facing the cutting edge of the blade or facing the side of the blade. Large items cut into large pieces may be more safely cut in front of the blade. Where close work is required, it may be better to work from the side using a slice device.

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- Slice devices and jigs: to use a slice device where the product is pushed against a plate set at the required slice thickness, the saw must also be provided with a rolling table. A jig for holding the product can be fitted to the rolling table. Push sticks are not usually a safe option for most meat cutting. This is more common in industries such as wood working where square solid products are more stable to feed into the saw. Slice devices and jigs are not the answer for all bandsaw work, mostly only an option for slicing. Large items are difficult to cut this way and many items do not have flat sides to secure in a jig. A good example of this would be a marrow bone, often cut into three or four pieces, being a knobbly shape and quite slippery.
  - Using a bandsaw safely needs care and concentration. The machine should be sited where the operator can have plenty of space and the working area should be fenced off to prevent people and trucks bumping into them. As well as keeping the floor clean the use of slip resistant materials and shoes should be considered. A recessed non slip grating for the operator may also reduce the slip risk. Good lighting is important and a value of 500 lux is recommended.
  - Selection of operators: the necessary physical and mental abilities should be considered, e.g. adequate eye sight.
  - Training: operatives should be trained in the 'underpinning' knowledge to understand the hazards of the job and then to a safe working procedure with risks highlighted as identified in the risk assessment on the job. A competent operative will meet the S.K.A.T.E. standard, that is skill, knowledge, attitude, training and experience. Until necessary experience is gained, trainees should be under direct supervision.
  - Trainers must be qualified in training skills and also have practical skills, preferably experienced bandsaw operators themselves.
  - Suitable signage should be in place, including **DANGEROUS MACHINE** and **DO NOT DISTRACT THE OPERATOR**.
  - Each task to be undertaken on the bandsaw should be considered separately to decide if it can be done reasonably safely and if so how, then safe working procedures can be devised and managed.
  - Provision of clothing and personal protective equipment: loose clothing should be avoided, and overall sleeves should be short or elasticated to avoid entanglement. Gloves may be worn if cold or grip necessitates it, but gloves must not risk entanglement and for this reason chain mail must not be worn. Footwear should have a good grip and toe protection. Head protection may also be required, for example, when working from an overhead rail. Hearing protection is recommended as it also reduces distractions.



### Operator precautions

- The operator should never reach past the blade to retrieve cuts. Product should be pushed off the table into a bin or on to a conveyer by pushing with the next cut.  
**NEVER USE A THIRD PARTY TO PULL OFF PRODUCT.**
- Personal protective equipment: loose clothing should be avoided, and overall sleeves should be short or elasticated to avoid entanglement. Gloves may be worn if cold or grip necessitates it, but gloves must not risk entanglement and for this reason chain mail must not be worn when operating the saw. Footwear should have a good grip and toe protection. Always report worn footwear. Head protection may also be required, for example, when working from an overhead rail. Hearing protection is recommended as it also reduces distractions.
- Only the minimum of blade, enough to make the cut, should be exposed and the rest of the blade should be guarded.
- Using a bandsaw safely needs care and concentration. The machine should be sited where the operator can have plenty of space and the working area should be fenced off to prevent people and trucks bumping into them.
- Operators should adopt a 'clean as you go' policy to ensure the floor is kept clean.
- Pre-start checks: these will be specific to the individual machine as guarding and feed devices will vary, but will include electrical parts, interlocks, emergency stops, guarding and stopping time.

### Maintenance

Due to the various product temperatures, wear of parts should be monitored closely, with particular attention paid to:

- Blade guides, including blade cleaning strips.
- Bearings including shafts.
- Wheel "back stops" need particular attention.
- Top wheel adjustment spring (replace annually).
- Daily check to blade guards. (moving up and down applying lubrication).

### REFERENCES

BS EN 12268:2003

PUWER : the Provision and Use of Workplace Equipment Regulations, 1998

## Bowl Choppers

### DESCRIPTION

Bowl choppers are used extensively within the meat industry to mince meat to a fine degree and to blend and emulsify proteins. The machine comprises a rotating bowl into which meat, protein and other ingredients are deposited, manually on small machines or by means of a mechanised container tipper on large machines. Ingredients are minced in the bowl by a multi-bladed revolving knife positioned at the rear of the bowl and revolving in the vertical plane. Most machines have a selected range of knife speeds.

Manual removal of product is common on small machines, but large machines are usually fitted with an uploading scraper which discharges the product from the bowl into a container via a chute.

### HAZARDS

- Contact with moving and stationary blades
- Electrical hazard from wet cleaning
- Dusty product
- Injury by contact with moving container tippers
- Noise

### PRECAUTIONS

1. The knife blades and associated drive shaft must be guarded to the greatest practicable extent. As a minimum they should be protected by a hood which extends to the width of the machine and to at least half the bowl diameter. The hood should be interlocked with the machine drive and fitted with a suitable overrun device. Many machines will also be fitted with a lid which also encloses the front of the bowl when lowered, however this is to reduce noise at high speed and will prevent pieces of blade flying out if the blade breaks. It is raised at low speed to enable the bowl to be filled or emptied. In addition to the hood at the rear of the machine, it is recommended that the following additional safeguards are provided;
  - (a) A non-return flap should be fitted to the outfeed side of the rear hood, so arranged that with no material in the bowl, it falls by gravity to the vertical position and with material in the bowl, it rides on top of material being processed. Suitable stops should be fitted to ensure that the flap cannot be raised upwards beyond the horizontal position. Stops should also be fitted to prevent the flap being pushed back towards the blades unless the flap is shaped to a profile slightly larger than the internal surface of the bowl, thus achieving the same result.
  - (b) As it is not possible to entirely enclose the infeed side of the blade the reach distance for an operative must be 850mm or more when standing on the floor. Some machines already have the 850mm reach distance to the blade, but where this is not the case, the reach can be increased by fitting a bar, as can be seen in the picture below.
2. An identifiable isolator switch that can be locked off should be positioned adjacent to the machine. The machine should be isolated by turning the switch to the off position and locking off with a lock off device before cleaning commences.



3. During the cleaning of the machine a guard or cover should be in position over the blades, except when they are being cleaned.
4. Blades should only be removed or refitted by a competent person using a blade guard or carrier.
5. The floor around the machine should be kept clean and clear of other persons. On machines incorporating a container tipper, the operator needs to see the motion of the tipper to avoid danger to other persons in the area.
6. Potentially dusty ingredients should be pre-damped or pre-mixed to ensure that dust is not evolved during the adding of material to the machine. Where this is not practicable it may be necessary to provide local exhaust ventilation to remove the dust.
7. Noise levels should be assessed in accordance with the [Noise at Work Regulations](#). Since a high proportion of noise results from contact between the blades and product, noise reduction hoods and the use of lower speeds may achieve a significant reduction. Worn shafts and bearings on older machines may be a significant noise source. Badly balanced blades also cause noise as does a lack of proper lubrication. Where noise reduction cannot be achieved, segregation of noisy machines may be necessary, along with the use of hearing protection.

Note: BS EN 12855: 2003, all bowl choppers purchased from 2003 should meet this standard.

**Users of Bowl Choppers Pre 2003 Should:**

Compare the standard of safeguarding on an old machine with BS EN 12855 and determine what is missing by way of guarding, (i.e. the risk gap). Any risk gap should be closed as far as is reasonably practical weighing cost v risk. Although BS ENs are not retrospective this is useful advice to ensure machines are as safe as reasonably practical.

**Consultation and Risk Assessment:**

Operatives should be consulted when new machines are to be installed or when there are changes in operation that may affect their health and safety.

Risk assessments must be carried out for operating, cleaning and maintenance of these machines. Employees should also be involved in these assessments.

**Training:**

Safe working procedures for operation, cleaning and maintenance should be devised based on and including the risks identified and then staff should be trained to these procedures. Monitoring to ensure procedures are adhered to should be carried out with regular job observations.

## Brine Injectors

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### DESCRIPTION

Brine injectors are used extensively within the meat industry to inject brine evenly into meat, for example for curing.

Meat is transported to the injection position by means of a conveyor belt, which forms an integral part of the machine. Brine from a storage tank is pumped to the head of a machine and then into the bank of needles. The brine is injected into the meat via either a pneumatically or hydraulically operated vertical needle beam. On some types of machine a pneumatically driven meat stripper puts adjustable pressure on the meat during the injection period to ensure that any meat which is held on the needles when the needle beam starts its upwards stroke is retained on the conveyor.

### HAZARDS

- Traps associated with the injector needles and the needle beam
- Possible dangers from electrical fittings while cleaning.
- Traps associated with the meat conveyor belt.
- Possible access to the drive mechanism.

### PRECAUTIONS

1. Fixed guards should be provided at the feed and discharge ends of the conveyor to a distance of at least 1,000 mm from the outside of the needle beam to prevent access to the traps formed by the injector needles.
2. The side panels of the machine enclosing the drive mechanism should be fixed by means requiring a tool other than a screw driver for their removal.
3. It is recommended that an additional emergency stop button should be positioned at the discharge side of the machine in addition to the one provided normally at the feed side of the machine. The emergency stop button should stop not only electrically driven components but those driven by hydraulic or pneumatic power.
4. An earth-leakage circuit breaker should be fitted to the machine to ensure operator safety especially whilst the cleaning operation is taking place.
5. Any traps between the conveyor belt and the tail and head pulleys of the conveyor should be provided with suitable fixed guards.

## Gas Flushing Systems

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### DESCRIPTION

Gas flushing is incorporated into packaging machines to improve product shelf life. Typical gases used are Carbon Dioxide, Nitrogen, Oxygen or a mixture of inert gases.

The gas flush is performed at the pre-final sealing stage and is normally carried out at low pressure.

### HAZARDS

- Storage of gases.
- Gas leaks.
- Excess gas from chamber machines.  
(The gas outside the package).
- Oxygen enrichment. Normal air contains 21% oxygen. In concentrations higher than 21% substances are more readily ignited burning faster and at higher temperatures. Oxygen enrichment to around 25% should be considered dangerous.
- Inert gases and oxygen depletion. Leakage of inert gases can deplete the room air of oxygen and create an asphyxiation risk.

Occupational exposure limits for some gases are contained in the [HSE publication EH40 entitled "Occupational Exposure Limits"](#).

### PRECAUTIONS

1. Bulk storage of oxygen should comply with the British Compressed Gases Association (BCGA) [Code of Practice CP36: Bulk Cryogenic Liquid Storage at User's Premises](#).
2. Bulk storage of liquid nitrogen and liquid inert gases should be in accordance with guidance from HSE reproduced as Appendix I.
3. Bulk storage of Carbon Dioxide should be in accordance with the BCGA COP 4.
4. All gas bottle storage should be in a well-ventilated area preferably external to the building. A cage or similar protection is required to prevent impact damage from vehicles. All bottles should be made stable by the use of secure anchorages. If it is not possible to site bottles outside, good bottle management should be encouraged to ensure that a minimum of filled bottles is inside the building. Empty bottles should be removed as soon as possible.
5. All pipework should be installed to BCGA COP 4. Wherever possible the gas pipework should be of a continuous pipework run and protected from external damage. Flexible pipework should be kept to a minimum length so that it does not become a trip hazard. Rupture or leakage of pipework can give rise to an oxygen enrichment fire hazard and/or an inert gas asphyxiation hazard.

Pressure gauges should be fitted at the gas source and local to the packaging machine. The use of a "No Gas-No Operation" detector is recommended.

All distribution pipework should be provided with a means of isolation clearly marked and upstream of any flexible hose.

Reducing valves should be fitted at the gas source (bottles or bulk) so that all piped gas lines within the building are at low pressure.

All gas lines should be colour coded with flow direction marked.

6. The gas supply should be isolated at the main source during any period of non-production.
7. A gas analyser should be made available for frequent periodic checks on room atmosphere.
8. Local exhaust ventilation should be considered at the point of use to avoid gas build-up, particularly if the operation is in a confined space.
9. Only qualified persons should adjust or change the operation of any gas flushing system.
10. Supervisory staff must ensure all operatives are aware of hazards arising from gas flushing operations.

#### APPENDIX 1

##### PRECAUTIONS FOR BULK LIQUEFIED NITROGEN AND LIQUEFIED INERT GAS STORAGE INSTALLATIONS

1. Simple asphyxiant liquefied gas storage installations should, whenever possible, be located in the open air and not in a space immediately surrounded by structures, which may unduly restrict natural ventilation. They should be kept well away from cellars and other areas which may be occupied and in which gas, which has leaked from the installation, may be liable to accumulate. If the storage installation has to be inside a building, it should be sited in a dedicated storeroom which is normally unoccupied, is isolated and is separated from any occupied parts of the building by means of a barrier that is impervious to gas. At least one side of the storeroom should be an outside wall.

If an indoor installation is necessary, the maximum possible natural ventilation should be achieved by fitting a louvred outside door and fitting louvres or steel mesh instead of windows etc. In underground rooms mechanical ventilation extracting at a low level in the room may also be necessary. Any mechanical ventilation system should discharge to a safe place in the open air. Basement or semi-basement locations and occupied rooms are the least desirable locations. There should be two separate exits to permit means of escape in the event of a significant release of nitrogen or inert gas into the storeroom.

2. For indoor installation the storeroom outside door should be secured in the fully open position during coupling and uncoupling of transfer hoses and during transfer of liquefied gas from road tanker to the bulk storage tank. The filling connection should be sited near to the main door.

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3. All vent pipes and any trycock from the bulk liquefied gas storage tank should discharge to a safe place in the open air as far from doors, windows and air intakes as is possible.
  4. The overpressure relief devices provided for the bulk liquefied gas in the storage tank and any interspace over pressure relief devices should generally be discharged to a safe place in the open air as far from doors, windows or air intakes as is possible.
  5. Transfer hoses and any sealing rings or gaskets associated with transfer hoses should be maintained in good condition.
  6. Adequate provision should be made to prevent unauthorised access to any liquefied nitrogen or liquefied inert gas bulk storage installation.
  7. Road tankers should be situated in the open air when discharging liquefied nitrogen or liquefied inert gas. The location should be such as not to restrict the dispersion of liquefied gas or heavy vapour. If possible the road tanker off-loading position should not be in a public thoroughfare. In cases where this cannot be avoided, warning notices to deter persons not concerned with the discharging operation from approaching should be erected and adequate supervision provided.
  8. A suitable system of work should be implemented to ensure that Dewar flasks are not overfilled. Any indoor decant lines used to fill Dewar flasks should be of the minimum necessary internal diameter for the flow rate required. Dewar flasks should not be left unattended.

Local exhaust ventilation should be provided if the filling of Dewar flasks directly from the bulk storage installation is carried out indoors. The maximum rate of flow of liquefied gas, which if spilled will subsequently vaporize to form a large volume of gas, may be used as a guide for the required capacity rating of the exhaust ventilation system.

A competent person should periodically inspect the gas storage installation.

## Dicers and Cubers

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### DESCRIPTION

Dicing or cubing machines are used to size reduce fresh meat and meat products into cubes.

There are several types in two main categories. These are:

- (1) Machines that push product through a lattice, forming strips and cutting those strips into cubes with a rotating sickle blade, and,
- (2) Machines that cut product into strips then use a multi-segment cutter head to produce cubes.

All types can have manual feed or semi-automatic or automatic feed with conveyors or loading devices.

Discharge is normally into a container but may be onto a conveyor.

### HAZARDS

- Access to the rotating blades at the discharge end.
- Access to the hopper or feed chamber.
- Crushing by a ram extending beyond the end of the feed tunnel.
- Trapping between a loading device and the machine.
- Handling blades during cleaning and maintenance

### PRECAUTIONS

The discharge aperture should not exceed the dimensions specified in BS EN 294 in relation to the distance from the blade. Alternatively, the machine should discharge into a container enclosure or on to a conveyor that prevents access to the blade and is interlocked so that the machine will not operate without these in position.

All non-fixed doors and covers giving access to dangerous parts should be interlocked.

When the cutting chamber door is opened by 20mm or a discharge system (container or conveyor) is removed, the cutting blades should stop in 0.15 seconds.

Hoppers should have some means of preventing access to the danger points. These include interlocked grids, trip bars or light barriers. On larger machines with hoppers over 1600mm there should be a mirror to see into the hopper or a fill level indicator.

If danger points in the hopper can be reached from steps or platforms these should be interlocked.

The ram should be set so that there is no gap between it and the tunnel and the machine should not operate unless the tunnel is in position.

There should be a gap of at least 120mm between the base of the machine and the loading device. Descent of the device should be controlled by a hold-to-run switch and should be no faster than 0.4 metres per second (mps). If the descent is automatic it should be at 0.1 mps and the last 0.5 metres should be controlled by hold-to-run.

### MAINTENANCE, BLADE REMOVAL AND CLEANING

Machines must always be isolated and locked off.

Carriers must be used to transport blades.

If the machine is worked on with blades in place a cover may be needed.

Gloves which give full protection must be worn for all these tasks.

### REFERENCES

**BS EN 13871** Cubes cutting machinery.



## Frozen Meat Cutter

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### DESCRIPTION

This machine is used to break up frozen blocks of boneless meat. This is done by a hydraulically operated guillotine blade or a rotary cutter blade that cuts the product into slices about 50mm thick in preparation for further mincing.

Product is loaded manually onto the machine before being pushed to a sloping feed tunnel to be carried by gravity to the blade.

The sliced meat falls into a container placed beneath a hinged cover that protects the outlet. Options are available such as a hydraulically operated feed platform, adjustments for size and shape of meat to be cut and a totally enclosed outlet container.

### HAZARDS

Access to the blade by the in-feed apparatus. This is possible if the operator stands on a platform or the feed slope is not protected by a loading table. Attempts to speed up the process by pushing the meat block or efforts to free any blockage are particularly dangerous.

Failure to interlock the hinged outlet cover would allow easy access to the moving blade. In some models access to the blade is possible from beneath the outlet cover either when a close fitting wheeled container is not in position or small containers such as trays are used.

### PRECAUTIONS

1. The guarding of the blade should be in accordance with the safety distances in BS EN ISO 13857:2008 Safety of machinery so that the operator cannot reach the blade. It should be impossible for a person to reach the blade when standing in any position next to the machine, and feed tables or loading devices should be incorporated into the machine in such a manner as to achieve this.
2. The safety devices at the feed opening of this machine can only ensure safety as long as an operator is standing at floor level and close supervision is necessary to ensure that elevated working platforms are not used.
3. The outlet cover should be fitted with an interlocked switch that is so designed as to render the equipment safe in the event of a failure.
4. When the discharge for the machine discharges into a collecting bin, either;
  - (a) the bin should be situated inside a suitably interlocked enclosure which completely encases it; or,
  - (b) where the bin when in position prevents access to the dangerous parts, a suitable sensing mechanism should be provided to ensure that the machine can only be run when the bin is in position.
5. When delivery is by conveyor, fixed or interlocked guards should be provided between the discharge of the machine and the conveyor to prevent access to the blade. Where the conveyor is removable, it should be interlocked with the machine in such a way that the machine cannot be run unless the conveyor is in position.

## High Speed Slicing Machines

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### DESCRIPTION

These slicers are used mainly for cooked meats. They have a variable cutting speed and are adjustable for slice thickness. The inclined blade is mounted eccentrically to provide the cutting action. The sliced meat discharges onto a conveyor. The machines can be gravity or power fed.

### HAZARDS

- Access to the blade from either the feed or discharge side, or if the blade cover is opened
- Handling the blade for cleaning or maintenance
- Electrical hazards from wet cleaning
- Meat gripper mechanism – sharp points

### PRECAUTIONS

1. Suitable guards should be provided to prevent access to the blade from the feed chute area. Where a fixed tunnel guard is used it should not be possible for a person standing at floor level to reach down the tunnel guard to the blade. Where a fixed tunnel guard is used however, it will be necessary to ensure that no person can stand in an elevated position where he may gain access to the blade. A suitable routine should be established to ensure that the machine is isolated before any cleaning is attempted. Ensure blade guard is fitted at any time blade is removed, also ensure that operative is wearing anticut/antislash gloves during removal operation.
2. Guarding the blade from the feed chute may also be done, by means of interlocked guards which when in position prevents any access to the blade. Opening on the interlocked guards should only be possible either;
  - a) after the blade is stationary; or,
  - b) after a shutter has come into position over the blade thereby preventing access during loading

Any guarding provided at the feed chute should be so arranged that adjustments can be carried out without altering the guard.

3. A suitable tunnel should be provided at the discharge end of the machine with openings that conform to the safety distances in BS EN 294. Where the discharge conveyor forms part of the guarding and can be removed for cleaning it should be suitably interlocked with the movement of the blade to ensure that the machine cannot be run unless the discharge conveyor is in position.
4. The blade itself should be completely encased, apart from the openings necessary for feed and discharge, should be suitably interlocked with the drive and be fitted with an overrun device where necessary. Suitable arrangements should be made for the collection of trim pieces of product and it should not be possible to reach up any discharge chute to the blade. Where the removal of a container for scraps allows access to the blade it should be suitably interlocked with the drive for the blade and fitted with suitable overrun protection where necessary.

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5. Cleaning of the machine should only be done by persons who have been specifically trained in the hazards of the machine and the routine followed for cleaning. Extra care should be taken whilst removing meat gripper mechanism as the hooked points can be very sharp.
  6. Undue vibration can occur if the blades are not kept properly balanced and a routine to ensure proper maintenance and balancing of the blades is essential.
  7. The use of suitable anti-vibration and anti-slip floor mountings is recommended in instances where the machine is not secured to the floor.
  8. Effort should be made to ensure that foreign bodies do not come into contact with rotating blade.
  9. During operation meat waste can be generated which falls to the floor – always ensure that there are collection trays mounted below openings to catch this and ensure that adequate hygiene provision is made for area.

#### **ADDITIONAL HAZARDS OF POWER FED MACHINES**

Trapping caused by the powered feeding device to feed the meat into rotating blade.

On some machines there may be additional hazards from the discharge mechanism to the conveyor.

## Tenderisers

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### DESCRIPTION

Mechanical tenderisers provide a quick means of breaking up tough connective tissue and supply a product of uniform tenderness prior to further processing.

The machines consist essentially of sharp serrated discs mounted on twin rotating shafts into which unfrozen meat is fed by means of an endless belt conveyor. Discharge is normally into another conveyor or into a suitable container.

### HAZARDS

1. The main hazard associated with the machine is contact with the serrated tenderising discs.
2. Hazards associated with the infeed and outfeed belt conveyors.
3. Electrical hazards due to the wet environment in which these machines are often used.

### PRECAUTIONS

1. The guard over the serrated discs to protect the infeed at the serrated discs should extend to a distance of 1000 mm along the infeed conveyor. Any part of the guard which requires to be removed for cleaning should be suitably interlocked.
2. The guarding provided at the outfeed end of the machine will depend on whether or not the product is removed by conveyor or fed into a collecting bin. If the product is removed from the machine by conveyor the conveyor should be guarded to a distance of 1,000 mm from the danger point. Any part of the guard which is removable for cleaning should be suitable interlocked.
3. When the discharge for the machine discharges into a collecting bin either:
  - (a) the bin should be situated inside a suitable interlocked enclosure; or
  - (b) where the bin when in position prevents access to the dangerous parts a suitable sensing mechanism should be provided to ensure that the machine can only be run when the bin is in position.
4. Where the machine is fed by the conveyor or where the delivery is affected by conveyor and the conveyor is removable, the conveyor should be interlocked with the machine in such a way that the machine cannot be run unless the conveyor is in position.
5. Suitable fixed guards should be provided to protect the intake between the conveyor belt and the head and tail drums of the conveyor.
6. An earth leakage circuit breaker should be fitted to the machine.
7. An emergency stop button should be provided and located at the infeed point of the conveyor.
8. A safe system of work should be established and enforced for the cleaning of this type of machine.

## Mincemasters and Lowboys

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### DESCRIPTION

These machines are used to mince meat to a fine degree and to blend and emulsify proteins.

Mincemasters comprise of a hopper mounted vertically above a revolving knife assembly directly driven from a base motor. Product is minced through a fixed cutting plate and ejected by an impeller blade through a chute into a container.

Lowboys are in effect horizontally mounted mincemasters using a worm to feed the knife assembly.

### HAZARDS

- Access through the feed opening to the worm feed on lowboys and knife assembly on mincemasters
- Access to the impeller blade on both mincemasters and lowboys through the discharge opening
- Ejection of product from mincemaster feed hopper
- High noise levels, particularly when using frozen materials

### PRECAUTIONS

#### Mincemasters

1. Access to the knife assembly via the feed opening in the conical hopper should be restricted by a fixed plate.
2. Access through the feed chute should be restricted, for example by a grid or bars, or the safety distance should comply with BS EN ISO 13857:2008 *Safety of Machinery*. *Safety distances to prevent hazard zones being reached by upper and lower limbs replaces* the current legal requirements.
3. Time delay interlocks should be used when removal of parts like the hopper and the feed chute can give access to dangerous areas during rundown.
4. A hinged flap should be provided to prevent ejection of product.
5. Under known circumstances are automated cut off devices that render the machine inoperable if the guard is open to be by-passed with the use of knives or any other device. Such behaviour is known to have caused serious injury to operatives in the past, and management are strongly urged to take robust disciplinary action if such actions are found on their site.

#### Lowboys

1. An interlocked infeed grid should be fitted to prevent access to the worm assembly
2. The knife assembly adjustment should give sufficient time delay for over-run. The cutting chamber assembly should be interlocked so that the machine cannot be operated unless the machine is fully assembled.

#### Noise

1. Noise levels on these machines are high and a noise assessment should be done and suitable measures taken to reduce noise at source.
2. The fitting of rigid or flexible plastic enclosures including tops can reduce levels by 10 – 15 dB (A)

## Smokers and Cookers

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### DESCRIPTION

These units typically consist of an enclosed chamber in which meat or meat products are cooked and/or smoked. Door(s) to the chamber can be at both front and rear. Heat can be introduced by steam, electricity, gas, and also in the case of smokers, by a friction wheel on wood method.

Depending on the cooker size, product is carried on racks either as single trays or multi-tiered trolleys.

Control of temperature, smoke, cooling showers (if fitted) and time cycle is achieved either by individual controls or jointly with a Programmable Logic Controller Unit (PLC).

### HAZARDS

- Burns from hot product racks or trolleys.
- Slips and falls whilst manoeuvring loaded trolleys into/out of cookers over chamber floors coated with fat and water.
- Heat exposure
- Exposure to wood smoke, which contains carcinogens.
- Exposure (e.g. skin contact) to smoke condensate, which is carcinogenic.
- Burns while tending the smoke generator.
- Fire (from smoke generator).
- Injury from premature turning on of steam, gas, electric services or smoke generator whilst persons are present inside the chamber (e.g. for maintenance or cleaning).
- Corrosive and/or toxic chemicals used for cleaning the cooker smoker, the product racks or trolleys and smoke generators.
- Gas explosion if flame extinguishers and gas supply continues.

### PRECAUTIONS

1. Where fitted, the cold-water shower should be used to cool the chamber before removing product. Otherwise suitable personal protective equipment should be used.
2. The floor should have a grip face finish together with drains to remove excess water.
3. Door interlocks should;
  - prevent doors opening during high temperature phases of the cooking cycle when entry would be dangerous,
  - prevent start of cooking or smoking cycles until doors are closed,
  - Interlocking to prevent doors being opened whilst smoke is present within the chamber and close down smoke generation and start extract fan purge to clear the smoke if the door is opened before the smoking cycle is complete.
4. Chamber door seals should be checked regularly and maintained in good condition.
5. Smoke generators should be maintained as directed by the makers. Particular attention is needed to clear ash and keep combustible material safe, especially to the base area of ovens to avoid build up.

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6. Hazardous substances (including cleaning chemicals and smoke) must have a COSHH assessment.
  7. Friction smokers should have flame detection to avoid undetected fires.

#### **MAINTENANCE**

Before undertaking maintenance work the cooker services must be isolated and locked off. Special attention should be given to retained heat on internal parts, steam valves, fans, baffles, and friction wheel drive components etc.

All safety systems, interlocks etc should be checked for operation before the machine is returned to normal use.

#### **CLEANING AND HYGIENE**

A 'clean as you go' procedure is recommended to avoid build up of debris on oven base, cooker racks etc. Smoker flues should be regularly cleaned. The cooker/smoker cabinet, flues and the product support racks should be cleaned according to a schedule that states the method, materials, water temperature and the PPE to be used.

## Hopper Fed Sausage Fillers

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### DESCRIPTION

Sausage fillers are widely used to fill both natural and artificial casings with sausage meat.

Meat from a feed-hopper under a partial vacuum is fed by a pump or through a worm/scroll to a nozzle where it is squeezed into the casing.

Casings are fed onto the nozzle either manually or mechanically through a forming attachment.

Large machines may be manually fed or by a hoist, tipper or electric clamp truck.

The feed hopper on some machines can be tipped over for cleaning on release of a clamp. On large machines the hopper may be swung in and out of position under power.

### HAZARDS

- Contact with the pump mechanism or worm/scroll feed in the bottom of the hopper, either via the hopper when the machine is in operation or when the hopper is tipped over for cleaning etc.
- Contact with any scraper mechanism as it moves round over the internal surface of the hopper.
- There is a possible trapping point between the hopper and frame of the machine where the hopper moves under power.
- Most injuries at this class of machine occur at the end of the production run or during cleaning when operators reach into the hopper to push meat residue down onto the feeding mechanism.

### PRECAUTIONS

1. Access into the feed hopper, to the scraper mechanism and to the feeding device in the bottom of the hopper should be prevented when the machine is in operation.
2. Where machines are manually fed, then irrespective of their size, a suitable hopper guard should be provided.
3. Where machines are mechanically fed, then unless the safety distance as described in the standards which follow, can be achieved, a suitable hopper guard should be provided. *BS EN ISO 13857:2008 Safety of Machinery Safety distances to prevent hazard zones being reached by upper and lower limbs*, replaces both *BS EN 294:1992 Safety of Machinery. Safety distances to prevent danger zones being reached by the upper limbs* and *BS EN 811:1997 Safety of Machinery. Safety distances to prevent danger zones being reached by the lower limbs*. Both of these former standards are superseded and withdrawn as of 30 April 2008,.

The distance to the danger point should be measured from the highest operating position. This might be the floor or a set of steps etc. The danger point will be measured by the scraper where one is fitted.



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4. Even where the "safety distance" can be achieved it is recommended that a suitable hopper guard be fitted unless it is not reasonably practicable to do so.
  5. Where the hopper can be tipped over, it should be interlocked so that the machine cannot be operated with the hopper out of position. If necessary a time delay device should be fitted so that moving parts at the bottom of the hopper are stationary before it is removed.
  6. Where the hopper is driven in and out of position the controls should be hold-to-run.
  7. Hoppers should only be tipped when empty.
  8. Where operators need to see into the hopper then a mirror can be clamped on to the rim of the hopper so its contents can be visually checked from the floor.

## Hamburger (Patty) Forming and Extruding Machines

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### DESCRIPTION

Although designs vary, the principle of these machines is the moulding of minced or ground product into portions. A mould is filled in one position and moved to another for the completed product to be ejected. Material is fed via a feed tray or, more commonly, into a hopper. This may be done manually or mechanically using a hoist, tipper or electric clamp truck or automatically via a conveyor. Scrapers or paddles may be fitted inside the hopper to aid mixing and feeding. A feeding device in the hopper takes the material to the forming station. The feeding device may be a worm/scroll or piston (or set of pistons).

The product is pressed into a mould plate and from here a tool known as a knock-out cup ejects it.

Machines may be categorised according to the way the mould plate operates:

**Reciprocating machines.** Here the mould plate (a plastic slide with circular holes cut in it) emerges from the forming station and at the end of its outward travel an injection plunger (the knock out cup) pushes the formed shapes out of the slide, usually onto a discharge conveyor.

**Rotary machines.** On these machines the mould plate is round with a number of circular holes or forming pockets in it. As the mould plate rotates a plunger ejects the shape and it is removed by a conveyor as above or by a scraper, which can be manual or mechanical.

Both machines may be fitted with a mechanism that places a piece of paper between each formed portion.

### HAZARDS

- Contact with the feeding device (whether pistons or scroll feed etc) or with the scrapers and paddles in the hopper.
- On some machines access may be possible via the hopper or the outfeed to the traps created by cams and blades etc at the forming station.
- There are shear traps between the ejection plunger and the mould plate.
- Shear traps between the mould plate and the frame of the machine as the mould plate either rotates or reciprocates.
- Traps created by the moving parts at the paper interleaving mechanism if fitted.
- Traps associated with scoring attachments sometimes fitted at the outfeed.
- Contact with mechanical feeding devices and/or containers of meat being lifted or lowered.

### PRECAUTIONS

- I. Access into the feed hopper, to the scraper/paddles or to the feeding device should be prevented when the machine is in operation. A suitable hopper guard should be provided. This guard should normally be interlocked with the machine so the machine cannot be operated until the guard is in position and opening the guard stops the machine. The guard may be a grid with suitably placed bars.

2. If the feed machine is fitted with a feed tray then a restrictor plate similar to the ones found on mincing machines should be fitted over the feed opening to prevent access to the feeding device.
3. Guards (which normally form the body of the machine) should be fitted to prevent access to the various trapping points that exist at the forming station. Fixed and/or interlocked guards may be used.
4. Suitable guards should be provided at the discharge to prevent access to the forming station and to the traps associate with the ejectors and paper interleaving mechanism (if fitted).
5. The guard at the discharge is removed frequently for cleaning and clearing blockages etc; it should be interlocked with the power supply
6. Suitable interlocked guards should be provided over the scoring attachments.

**Extrusion machine.** This is an attachment to a standard mincing machine. Meat is extruded from the mincer to form a continuous strip on top of a slip of paper. The strip is cut into portions by a solenoid-operated guillotine.

With the exception of the outfeed mechanisms the hazards and the precautions are broadly similar to those of patty formers. The guillotine presents a different hazard and it should be covered with a tunnel guard whose dimensions comply with the safety distances of BS EN 294. As the cover is lifted frequently for cleaning it should be interlocked with the power supply.

#### GENERAL

If it is necessary to push meat down onto the feeding device then a suitable scraper should be used. This should be designed so that the scraper cannot become entangled on the feeding device itself.

Where it is necessary to see into the hopper then a mirror (polished stainless steel, not glass) should be clamped to the rim of the hopper.

## Derinders, Skinning and Membrane Machines

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### DESCRIPTION

These machines consist of a rotating toothed or serrated roller set beneath a fixed blade. When product is fed into the machine the roller grips the skin or membrane and leads the product to the blade where meat is separated and the skin or membranes fed to a waste chute.

The machine can be hand fed or conveyor fed. Only round or irregular product such as hams can be processed on hand fed machines. Where possible all other product must be processed on conveyor fed machines with suitable tunnel guarding.

For most purposes on hand fed machines the gap between the roller and the blade is kept very narrow. On membrane or skinning machines this feed gap is normally non-adjustable and set at <1 mm. BS EN 12355 allows a maximum gap of 5mm but normally a maximum gap of 3mm should be used for derinding purposes.

### HAZARDS

- The main hazard is on hand fed machines and these have been a common cause of accidents. Usually, the hand is drawn onto the blade by the roller and skin is lost from the fingertips and fleshy parts of the hand or the wrist. Skin grafting is often required.
- Conveyor fed machines may have access to blade and moving parts
- Some machines have been found to have access to the moving parts and blade via the membrane discharge
- Other injuries occur during cleaning, maintenance and removal of blades

### PRECAUTIONS

1. The correct machine should be chosen for the job. Hand fed machines must not be used where product is suitable for conveyor fed machines.
2. The blade must not be inserted upside down. Very severe accidents have been caused in this way.
3. A low voltage shrouded foot pedal should be used as the machine start/run control. A belly bar should only be used as a stopping device.
4. Blades and rollers must be kept in good condition as blunt parts encourage operators to stab product on to the machine increasing the risk of injury.
5. Touch-stop/disconnect devices. All hand fed machines should be fitted with electrical devices that include the operator in an electrical circuit and which stop the machine when the device detects a circuit change. The operator is required to wear conductive gloves, which are connected to the machine and rubber over-gloves of the type mentioned above. If the rubber gloves are damaged and the conductive material or the operator's skin completes a circuit to earth, the machine will stop its motion and reverse for part of the roller circumference.

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6. Chain mail gloves must not be worn. Serious accidents have occurred when chain mail gloves were drawn in to the mechanism causing such serious crushing injuries that fingers had to be amputated.
  7. Suitable training is very important. Operators must be fully trained to understand the machine controls and the dangers of the machines so that they know what to do in the event of an emergency.
  8. Only competent persons over the age of 18 should operate the machines.
  9. To protect third parties the machine should be sited where the operator will not be distracted by those working in the vicinity and so that access to the dangerous parts is prevented as much as possible.
  10. On conveyor fed machines dimensions of guards should be to BS EN 294.
  11. Cleaning, maintenance and blade removal: machines should be isolated and locked off. Protective gloves worn. Safe carriers for blades should be used.
  12. Removing waste. There must be no access up through the discharge to the blade or rollers. Machines should be isolated before removing waste.

#### REFERENCE

BS EN 12355 Derinding machines.

## Loin Pullers

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Loin pullers are used to produce a high quality loin with the required thickness of rind and fat removed. The two main types of machine have either a fixed or a moving knife.

### FIXED KNIFE MACHINE

#### DESCRIPTION

The loin is placed back down on the infeed side of the belt conveyor. A driven ribbed roller pulls the loin into the machine and a pneumatic hold-down clamp is triggered. The oscillating cutting blade mounted just to the rear of the clamp cuts off the required thickness of rind. The depth of cut can be adjusted manually or on some machines, automatically.

#### HAZARDS

- Contact with the blade
- Trapping under the clamp
- Nip point between driven roller and the conveyor belt.

#### PRECAUTIONS

1. A fixed and/or interlocked guard should be provided to prevent access to feed roller, clamp and blade. Tunnel guards should comply with the safety distances in BS EN ISO 13857:2008 *Safety of Machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs* **replaces** both BS EN 294:1992 *Safety of Machinery. Safety distances to prevent danger zones being reached by the upper limbs* and BS EN 811:1997 *Safety of Machinery. Safety distances to prevent danger zones being reached by the lower limbs*. Both of these former standards are superseded and withdrawn as of 30 April 2008.

### MOVING KNIFE MACHINE

#### DESCRIPTION

The machine comprises an adjustable height receiver bed, a pneumatically operated hold down bar, and a pneumatic piston to draw and return a shaped knife through the loin. A small steam jet is used to heat and clean the blade to make cutting easier.

The loin is placed in the receiver bed rind down. The bed is adjusted to the required height and the start valve button is depressed starting a sequence of automatic operations. First the hold-down bar clamps the loin; then the knife is drawn through it. Next, the bed is released to drop the rind and loin onto the discharge conveyor, and the machine returns to the start position.

#### HAZARDS

- Contact with the cutting knife.
- Trapping by hinged receiver bed and the hold down bar.
- Scalding by steam/hot water jet.

#### PRECAUTIONS

1. Guarding should be provided to prevent dangerous access to the knife blade and associated pneumatic equipment. Opening of an interlocked guard should arrest the automatic sequence and exhaust the air in the system.

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2. Where the machine delivers onto a conveyor then a tunnel guard should be provided and should comply with the safety distances in BS EN ISO 13857:2008 *Safety of Machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs* **replaces** both BS EN 294:1992 *Safety of Machinery. Safety distances to prevent danger zones being reached by the upper limbs* and BS EN 811:1997 *Safety of Machinery. Safety distances to prevent danger zones being reached by the lower limbs*. Both of these former standards are superseded and withdrawn as of 30 April 2008.
  3. Where the machine discharges into a collecting bin this should be interlocked such that its removal isolates and exhausts the pneumatic supply.
  4. The steam/hot water jet should be enclosed in a suitable tundish.

## Mechanical De-Boning Machine System

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### INTRODUCTION

Mechanical de-boning machines or liberators have largely replaced table boning in beef boning plants in recent years. This is because it has become more difficult to attract skilled employees or people who are capable of attaining the necessary skill. The mechanical system reduces both the skill level required and the number of boners needed. A table-boning line might typically have had twelve boners but a mechanical system will need just three or four. Liberators also help with controlling WRULD problems by reducing the manual force required on the knife and by eliminating the need to lift quarter and primal cuts.

### DESCRIPTION

The machine system comprises a support cradle and bone saw, a drop rail and two metal boxes, each containing an air driven ram and fitted with suitable controlling devices. (e.g. on/off pulleys, adjustable limit switches to control speed/air pressure and emergency stop buttons). The newer machines are usually electrically driven with a worm rather than a ram which gives far better control; these would be a better option for those considering installation of a new system. These machines can be situated either parallel or at a right angle to the rail system.

The basic function of the machine system is to provide a systematic method of de-boning and to aid the de-boning process by applying tension to leg-bone, hipbone and rib cage while cutting.

### HAZARDS

- Knife injuries
- Slip injuries due to build up of meat, fat and bone-dust on floor.
- Being struck by quarters falling from rails
- Being struck by quarters moving at speed on rails
- Manual handling and ergonomic issues e.g. muscular-skeletal disorders, back injuries.

### PRECAUTIONS

#### 1. Knife Injuries:

Appropriate equipment should be used to protect against cuts. A chain mail apron to cover the chest down to below the knee, (some positions may require full length split aprons or trousers), „shoulder length” chain mail glove on non-knife hand or complete shoulder and arm chain mail garment and cut resistant glove on knife hand.

- **Knives must be sharp.** Suitable sharpening equipment must be provided and operatives must be trained unless a sharpening service is provided.
- Adequate working space should be provided between operators, (normally a minimum of one metre around the operative).
- Scabbards should be worn by all operatives to hold knives when not in use.
- Designated walkways and clearly visible danger signs should be provided.
- All operatives must be trained in the safe use of knives.

#### 2. Slip Injuries

Floor gratings should be in place at the work stations to prevent build up of waste. If this is not possible with a built up stand because of the need to change the working height then the grating should be let into the floor. Gratings should be of the light carbon type rather than metal which present handling problems for cleaning



staff. Any loose waste around the area should be removed frequently during the working shift.

### 3. Struck-by Injuries

All possible precautions should be taken to ensure that quarters cannot leave the rail system. Points to pay particular attention to are as follows;

- At any point at which the quarter is hoisted from a low to high rail or vice-versa, stops should be fitted to hold the roller in place.
- Guardrails should be put in place at any curved part of the rail where the roller may be more likely to leave the rail.
- Care should be taken when hooking the quarter through the carpal tunnel on the fore and Achilles tendon on the hind before it enters the system. If the tendon is weak or damaged the operative should revert to hooking the quarter securely under a bone.
- Care should also be taken when transferring the boneless quarter at the second machine. As before, if the tendon is damaged the quarter should be broken down while attached to the bone.
- If possible the pulling machines should be at a right angle to the rail as to avoid the quarter speeding along the rail. If this is not possible then an appropriate brake should be fitted to control the speed of the quarter.
- Head protection must be worn.

### 4 Manual Handling

- If there is a potential risk of injury a manual handling assessment should be carried out to identify the risks and measures needed to eliminate or reduce the risk. However all handling tasks should be eliminated by design if possible. This is often done where liberators are installed under existing steel work by installing flighted conveyors. If it were a new build then it would be better to have the boning lines above the trimming stations so that cuts can be dropped down slides.

### 5. Ergonomics

Deboning machines have largely removed conditions experienced by boners in the past such as tendonitis. Problems that do occur now are usually caused by poor working positions.

- Workstations should be equipped with a support cradle designed to support the quarter at an angle so enabling the operator to adopt a comfortable posture and limiting the strain on the non-knife hand.
- The rail system should be at a median height of 2.2 m adjustable up and down. This can reduce both working with arms raised and stooping to work on lower parts of the quarter. It is important to consider whether sufficient height can be achieved when installing under existing steel work.
- Job rotation should be considered as one of the means of reducing risk.

### 6. Hand Held Saws

It should be noted that if possible all sawing operations should take place in the cutting room before the quarters go into the boning hall. This keeps the risks in an area where they can be managed and eliminates third party risk. Most new installations are organised in this way.

**HAZARDS:**

- Saw injuries
- Eye injury from flying bone chips
- Noise
- Ergonomic
- Controls
- Eye protection must be worn.
- Segregation/protection should be provided for third parties.
- Saws should be on a pulley, tensioned adequately so as to pull the saw above head height when not in use. Saws should be serviced regularly and blades changed when blunt.

**7. Noise**

Where noise exposure is above the permitted thresholds an assessment should be carried out and steps taken to reduce exposure. However hand held saws cannot usually be quietened sufficiently, in which case these stations should be moved outside the main boning hall to reduce the number of people at risk of exposure. The wearing of hearing defenders should be the last step in the hierarchy of control, although this will be necessary for saw operatives. Operatives must be trained on the safe working procedure.

**INSTALLATION SAFETY.**

- When installing the pulling machines, the following points should be considered:
- Where possible, the first pulling machine should be positioned at a right angle to the rail to avoid the risk of quarters moving at speed along the rail. However this is not an issue with the electronic machines
- The machine should be fitted with adequate controlling devices that the operative can adjust according to the type and size of the beef being processed.
- The support arm, which holds the quarter in place whilst being pulled, should have a height adjustment to suit the varying height of the operatives.
- The workstation design should provide enough space for all activities, while keeping the working points within convenient reach.
- At the second preparation station there should be a drop rail fitted to hold the quarter stationary and adjust the height of the quarter whilst working on it.
- At the final breakdown station there should be a stop to hold the quarter against while it is worked on. There should be a feed belt positioned directly below the workstation to limit both the lifting of the primals and the necessity for a pulling hook.

**REFERENCES**

**Manual Handling Operations Regulations 1992 L23**

Guidance on Regulations

**Reducing Noise at Work L108**

Guidance on the Noise at Work Regulations

**Guidance for employers on identifying hazards and controlling risks.**

## Safe Methods for Preparation of Fresh Meat Chops

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### INTRODUCTION

The Tribunal decision of Gateway Foodmarkets Limited v Sheila Patricia Walton, London Borough of Redbridge on 16,17,and 28 March 1988 clarified that hand feeding of bandsaws with fresh meat in the preparation of chops presented unacceptably high risks of injury and that such a practice had rightly been the subject of a Prohibition Notice issued under the [Health and Safety at Work etc. Act 1974](#). Bandsaws are inappropriate for the preparation of fresh meat chops where hand feeding is involved.

### SAFER METHODS

Where the quantities of fresh meat chops being produced are small the traditional methods involving the use of knife and cleaver are appropriate.

An alternative safe method where larger numbers of chops are to be produced is the use of the proprietary chop-slicing machine. Typical types are the Treif, Holac, and Varlet machines amongst many similar. The machine comprises a high speed scimitar-shaped rotating blade with both feed and delivery to the blade being protected by interlocked guard tunnels which prevent access whilst the blade is in motion.

## Mincing and Grinding Machines

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### DESCRIPTION

These machines come in various sizes. For convenience they have been divided into three groups; small, intermediate and grinders. The small machines are most common in butchers shops and other retail outlets, while the grinders are common in meat preparation factories. However, no group of machine is found exclusively in any one type of premises and therefore they will all be considered.

The machines are used to mince/grind material into small pieces. The worm/s of the machine forces material along the barrel through a series of rotating knives and fixed cutter plates, perforated with holes. These plates are usually interchangeable with others, having different sized holes, so that different grades of mince may be obtained.

### Machine Category

- (a) **Small:** These machines which have a cylindrical feed opening of not more than 54 mm (2.1/8") diameter, and situated not less than 127 mm (5") above the worm. Note these machines do not allow access to the worm, as the opening is less than hand width.
- (b) **Intermediate:** Feed opening or throat in excess of 54 mm (2.1/8") and/or less than 127 mm (5") above the worm. These machines should be guarded or fitted with a restrictor plate over the feed opening. See recommended precautions.
- (c) **Meat Grinders:** Have a substantial hopper with a large worm feed at the base. They are capable of dealing with several tons of meat an hour. The hopper may lead directly to the mincing worm, or to open flight worms which feed large pieces of meat into the mincing worm. These machines may be fed in a variety of ways; by hand, skip loading using a fork lift truck or other similar device, tote bin and bin lift, by auger, by conveyor; or through an opening in an upper floor.

### PHYSICAL HAZARDS

- Shear traps on the worm from the in-feed side.
- Access to the blades or knives, through discharge openings.
- Handling blades and plates etc particularly when freeing jams and stripping the machine down for cleaning.
- Sudden jerking movements from the push stick, during feeding.
- Dangers arise when the operators might be tempted to move the parts under power both when the machines are being fed and emptied and also during cleaning.

Injuries caused by these machines are usually of a serious nature and have included amputations of fingers, hands, arms and the large grinders have amputated legs, and have even caused fatalities.

In the past there have been many accidents at these machines to women and young people who, because they have smaller, thinner hands can reach the worm when an adult male may not.

## PRECAUTIONS

### In-Feed

#### (a) Small Machines:

Access to the worm should be restricted by the design and construction of the body of the machine. The feed opening above the worm should not exceed 54 mm (2.1/8") in diameter, and should not be situated less than 127 mm (5") above the worm. The restricted opening should afford permanent protection, even when the feed tray is removed. New machines are normally built incorporating these dimensions, but older machines may need to be modified. Some makers can provide modification kits.

Material may be fed to the worm using a suitable push stick. This push stick should be fitted with a restricting lip, of slightly larger diameter than the feed opening to prevent the push stick from coming into contact with the rotating worm.

#### (b) Intermediate Machines.

A restrictor plate should be provided over the feed opening. This must be robust and should be secured to the feed tray on at least two sides. See EN 12331 figs 6a and 6b.

When considering the dimensions of the plate, the following should be taken into account:

- The size of the feed throat opening.
- The height of the plate above the feed tray and
- The distance of the outer edge of the plate from the worm.

The plate must not be set so high that it is possible to reach down into the worm beneath the plate.

Almost invariably an opening is provided in the restrictor plate, so that meat can be pushed down to the worm using a push stick. It is important to ensure that this opening is not so large that it allows the operator access to the worm. Push sticks provided at these machines should be fitted with a restricting lip, of slightly larger diameter than the opening in the restrictor plate and be of such a length that it is not possible for them to come into contact with the worm.

#### (c) Grinders

Guarding of these machines is more complex than for the other groups, mainly because of the different methods of feeding which can be adopted, the variation in the size of material being fed, and because it is necessary to feed the machines while they are running and other times they may be fed while stationary.

These machines will often be supplied unguarded or with just a pull cord or rocker bar emergency stop device for this reason. The user of the machine must add suitable guarding according to the chosen feed method. The emergency stop system does not suffice as a guard as it is quite easy to reach over or step over such a device.



*Note red pull cord, which does not prevent access*

**Section 5.2.3.1 of EN 12331 states:**

“Access to the danger zones at the screw conveyor in the feed intake hopper shall be or made safe. This may be achieved by any of the following measures:

- The design (e.g. closed feed intake hoppers) including a closed loading device for products. (e.g. feed screw, pipeline with pump)
- The use of guards (e.g. a cover) see EN 953
- the use of electro sensitive protective devices (e.g. light barrier) see 292-2
- The use of fixed guards (e.g. fence) see EN 935”



*Above an interlocked extended reach guard for hand feeding*

**Feeding by Hand**

As an alternative to the interlocking lid an interlocked feed chute may be used. A minimum distance of 1 metre should be achieved between the feed screw and the lower lip of the feed chute.

**Feeding by Skip and FLT**

Where the machine is fed by skip, using a forklift truck, it is not always possible to provide an interlocking lid for the hopper. In this case, the sides of the hopper should be extended so that it is not possible for a person to reach into the dangerous parts from the normal operating level.



*Grinder hopper fenced to accommodate bin lift with extension to reach distance under the bin*

**Feeding by Tote Bin and Bin Lift**

Where practicable an interlocking lid should be provided over the hopper, with a portion cut out to allow the skip to discharge its contents. Additional fixed guarding can be provided around the cut out portion. Where this is not practicable it may be necessary as for point 3 above to extend the sides of the hopper.

**Bin Lifts**

**HAZARDS**

- Falling product and falling bins
- Entrapment

**PRECAUTIONS**

- Bins must be secured to lift with self closing clips
- Bin lift should either be entirely fenced from top to bottom or more commonly safe guarded by a ‘dead man’ control which requires the start button to be pressed continuously during operation

The use of steps is not and should not be encouraged, often they are only provided to allow operators to see into the hoppers. Correctly positioned mirrors can be used for this instead. Mirrors should be made out of stainless steel, aluminium or other polished metal.

Any feed stick provided for use from should not be long enough to reach down to the worm.

Some larger hoppers may be fed via chutes through openings in upper floors. Access at such openings should be prevented by width/distance or by fencing and interlocking any gates which allow access.



*Conveyor and auger fed machines. A fixed or interlocked guard over the top of the hopper/and conveyor can be provided. As shown above*

### Discharge

- (a) **Small and Intermediate Machines:** Where holes in the outer cutter plate at the discharge are more than 6mm (1/4") in diameter this will include kidney plates with elongated holes. It is imperative that adequate guarding should be provided, either by a shield or delivery chute.
- (b) **Grinders:** The same principles apply as for the other groups of machines. There are two main methods of guarding at the discharge:
- By interlocking hinged hood or cover, fitted with bars, spaced close enough together to prevent hand access between the bars to the outer plate.
  - By a profiled hood over the discharge, which is used in conjunction with interlocking bins, so that the machine will only run when the bin is in position.



*Above. An outfeed hood and interlock bin system. On larger machines for example 11 or 16" diameter worms over-run of the worm can be a problem. A Time-delay device should be fitted in addition to the interlock in such situations.*

### Degristlers

Degristler attachments at the discharge: these may be a tube through the plates or on the side of the discharge barrel. Although these fittings do not present an access risk in themselves, a special guard may be needed on the outfeed if the end plate holes are over 10mm.

### Interlocking

Interlocking has been referred to in a number of points above. Interlocking systems must comply with 4.2.1 of EN 1088.

### OTHER HAZARDS

- Noise:** larger machines usually emit levels in excess of 90dBs. Although a noise measurement is supplied with a new machine it should be remembered that the new is added to the existing noise level in the area so even a smaller quieter machine could put the noise level over the maximum under the latest edition of the noise regulations. Therefore a new survey must be carried out and appropriate precaution taken to reduce exposure as necessary.
- Electricity:** small machines usually run on 240v single phase through to the large grinders which are usually three phase, 416v and although ampage may vary it is usually 32amp. Often these machines are on plugs so they can be moved on and off line easily. Given the high voltages and the environment that the machines operate in this is not good practice and they should be hard wired wherever possible.

All machines should be fitted with a residual current breaker. There should be an isolation procedure in place, for cleaning, clearing and maintenance.

There must be regular inspection and electrical testing.

- Gases:** some machines are designed to use N<sub>2</sub>, CO<sub>2</sub> or steam. There must be an impervious cover fitted, with interlocks for both electricity supply and gas, which can also act as a guard. Gases should be purged to external atmosphere before the cover can open.

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**REFERENCES:**

**BS EN 12331: 2003**

Food Processing Machinery, mincing machines, safety and hygiene requirements.

**BS EN 953: 1998**

Safety of Machinery, Guards, general requirements for the design and construction of fixed and movable guards.

**BS EN 1088: 1996**

Safety of Machinery, Interlocking devices associated with guards.  
Principles for design and construction.

**Other related standards:**

**BS EN 294: 1992**

Safety of Machinery. Safety distances to prevent danger zones being reached by upper limbs.

**BS EN ISO 12100-2: 2003**

Safety of Machinery. Basic concepts and general principles for design. Basic terminology and methodology.

**BS EN ISO 12100-2: 2003**

Safety of Machinery. Basic technical principles.



## X-ray Detection Equipment - Management of Radiation Safety (New Guidance Note April 2012)

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### INTRODUCTION

In the continual quest to improve the quality of product offered to customers, new foreign object detection equipment has been developed. The traditional magnetic/inductive detectors are only capable of detecting metals, but there is a greater demand to detect plastics, stone, wood and paper. The current method of doing this is to use an X-ray source and compare relative density levels.

This equipment is now refined and is commercially available and technology has developed methods of generating X-rays with out recourse to a live radiation source. For some other applications live radiation sources are used, such as sanitisation.

Any source of radiation must be strictly controlled as the human body is very sensitive to above average levels, which can result in serious injury or death. Radiation is cumulative so not only must the level be kept to a minimum, but also the exposure time (the combined effect is known as the “dose”).

This guidance has been developed to help food business operators understand their duties under the following regulations.

### IONISING RADIATIONS REGULATIONS 1999

Annual dose limits in the EC are based on the recommendations on risk published by the International Commission on Radiological Protection (ICRP). In the UK, the Health Protection Agency (Radiation Protection Division) advises Government on standards to be adopted and has fully endorsed the ICRP recommendations for the worker dose limits prescribed in the [IRR99](#). Made under the Health and Safety at Work etc Act 1974, these Regulations apply to all users of radioactive materials or radiation generating equipment and are enforced by the **Health and Safety Executive**.

The Regulations are published together with supporting Approved Code of Practice and non-statutory guidance and contain specific requirements relating to employers who intend to work with ionising radiation or their advisers. Beyond the application of annual dose limits, the key principle to be applied is for all radiation exposures to be kept “as low as reasonably practicable” (**ALARP**).

**Notification to the HSE** [Reg 6]: First time work with radiation must be notified to the HSE by the employer at least 28 days before commencing work. This does not apply, however, to all work specified in Schedule 1, e.g. for X-rays where any electrical apparatus operating at a potential difference not exceeding 30kV and where the dose is less than 0.1  $\mu\text{Sv/h}$  at 0.1m. (Micro Sievert per hour) Note: most commercial apparatus exceeds this.

**Risk assessment** [Reg 7]: Before any new work involving radiation begins, the employer is required to carry out an assessment of both day-to-day operational risk and the risks of accidents resulting in exposure of the whole body or the hands/fingers to X-radiation. It is on the basis of this assessment that decisions should be made concerning the need to draft local rules, to designate certain areas and whether to classify employees. The supplier of the equipment can usually supply the assessment for the equipment, which only leaves the assessment of the work area to the customer.

The risk assessment must be 'suitable and sufficient'. In particular the assessment should follow the [HSE guide: '5 Steps to Risk Assessment'](#)

- a) the hazard is clearly identified, e.g. exposure of the hands to a collimated X-ray beam. (Technical requirements to test the equipment on a regular basis during production, mean that testing is generally the greatest risk, particularly as the magnetic/inductive equipment was routinely tested by reaching into the machine with a metal object. This must **NEVER** be allowed with X-ray equipment).
- b) those persons potentially affected are identified, e.g. operational staff.
- c) the risk is evaluated (low, medium or high) and decisions taken on whether the existing precautions are adequate or whether more should be done to reduce exposures to 'as low as reasonably practicable' (ALARP),
- d) record the findings, and
- e) set a date for periodic review.

The risk assessment should take into account both operational risk and the risk of accidents. Where a risk of exposure is identified, every effort is required to:

- prevent the accident occurring,
- limit the consequences (should it occur), and
- provide employees with information, instruction and training and the equipment necessary to restrict exposures.

## RESPONSIBILITIES

**Employer:** Many of the duties of the Regulations fall to the employer who works with ionising radiation, referred to as the 'radiation employer'.

**RPS [Reg 17(4)]:** Wherever work is supervised by local rules the employer should appoint in writing a Radiation Protection Supervisor (RPS) for ensuring compliance with the relevant regulations. The RPS carries the duty, on behalf of the company, of ensuring the local rules are properly followed and this duty should be detailed in their appointment letter. The RPS is required to be qualified and must attend a suitable short course. The RPS can be a contractor, but due to the necessary contact time if the equipment is in daily use, it is usually better to appoint someone in-house. Often the Health and Safety Manager/Advisor, Technical Manager/Operator, or Engineering Manager/Operator can fulfil this post.

**RPA [Reg 13]:** Appoint a Radiation Protection Advisor (RPA) for advice on all technical and administrative queries in relation to the industrial use of X-rays. Whilst there may not be requirement for on-going advice, an initial consultation is statutorily required. RPAs must be accredited by an HSE-recognised scheme for ensuring quality of advice. There are many contractors who can provide this service, including the Health Protection Agency. The RPA will usually supply all documentation and can carry out equipment commissioning certification, twice yearly audit and certification of test equipment required by the regulations. The RPA is responsible for auditing the work that the RPS carries out, and also commissioning equipment for first use. The work of the RPA is a legal requirement. If there is an incident the RPA and the HSE must be informed.

**Authorised persons:** Those persons who are to operate the X-ray instrument must be given *prior authorisation* by the RPS and be instructed in the local rules. It is convenient to call such individuals Authorised Persons. This must be documented.

**Restriction of exposures** [Reg 8]: Whilst the Regulations prescribe specific dose limits for both workers and members of the public, the over-riding control is the requirement to keep all exposures 'as low as reasonably practicable' (ALARP). For the majority of cases this means the application of physical protection (engineering controls and design features, safety features and warning devices, and provision of PPE), supported by written instructions for avoiding unnecessary exposure. Again this information should be supplied by the equipment manufacturers.

*Shielding* – The main priority must always be to prevent direct exposure of any part of the body to the primary, uncollimated radiation since this will cause serious injury after only very brief exposure. The **tube-shield** provides an essential part of this defence. When equipment has been fitted with safety shutters which ensure that only narrow **collimated beams** can emerge, the risk of serious injury is greatly reduced. A **beam stop** terminates the beam path beyond the specimen under examination. This is a requirement of the manufacturer of the equipment and a full shielding certificate must be supplied.

*Scattered radiation* – This is produced with high intensity where a primary beam first meets a collimator. Couplings between tube head and collimator are designed to limit the emergence of this radiation. The industry standard for limiting external exposure is a maximum of 1  $\mu$ Sv/h.

*Enclosures* – The operator's hands are prevented from accessing the main beam by housing the X-ray device within a total enclosure which acts as a physical barrier.

*Warning signals* – Serious accidents have been caused by inadvertently carrying out of maintenance on shutters in the presence of X-radiation. Clear indication is therefore required when X-rays are being generated. All sets are fitted with reliable and conspicuous 'X-RAYS ON' signs, sited close to the tube heads. A clear indication is required of the shutter state since shutters have the potential to fail. This is a legal design requirement.

*Interlocks* – Enclosure panels may be interlocked so that either a shutter closes to intercept the beam, or X-ray generation ceases. Shutters must be guaranteed to close whenever there is no camera or collimator at the tube port.

**Maintenance** [Reg 10]: Engineered controls must be adequately maintained and periodically examined. The warning lamps, guarding, interlocks (if applicable) and shielding will be checked by a service engineer at routine service intervals. The user should not attempt to service the unit or dismantle any part of the system. The normal procedure is to physically check the safety systems and condition of guards and interlocks before start of production and not less than daily where used continuously. Leakage of radiation should be tested weekly and always after maintenance or breakdown, using a dose rate meter. Dose rate meter readings must be documented.

**Contingency plans** [Reg 12]: Where the risk assessment shows that a radiation accident is reasonably foreseeable, the employer must prepare a contingency plan to ensure that doses to those affected are restricted to a minimum. A suitable response plan is to be detailed for each accident scenario identified and incorporated into the local rules.

**Information, instruction and training** [Reg 14]: In addition to his/her duties, the RPS must be formally trained in the basics of ionising radiation and radiation dose. Operators of the equipment, or those who work in close proximity should then be *instructed* by the RPS in the local rules. Contractors or visitors to the site may need to be informed of the presence of the radiation hazard.

**Designated areas** [Reg 16]: In order to restrict employee doses, controls are placed on areas with enhanced radiation exposure or a significant presence of radioactive material. Such controls may take the form of routinely monitoring the radiation and/or restricting access to certain authorised employees. In all cases the employer must have control over the area in question.

A **Controlled Area** is required to be designated where:

- A risk assessment indicates the need for special procedures to be followed, designated to restrict exposure and / or limit the probability of an accident involving the source of radiation; or
- An employee (aged 18 or over) is likely to receive an effective dose greater than 6mSv per year, or an equivalent dose greater than three-tenths of any relevant dose limit.

**In practice, a Controlled Area is designated wherever the measured dose-rate exceeds 7.5µSv/h**

A **Supervised Area** is required to be designated where:

- It is necessary to keep conditions in the area under review to check on whether it has moved into Controlled Area status, or
- An employee (aged 18 or over) is likely to receive an effective dose greater than 1mSv per year, or an equivalent dose greater than one-tenth of any relevant dose limit.

Equipment manufacturers will give advice on whether their equipment requires a designated area or not.

Modern X-ray foreign object detectors are extremely safe and effective so long as they are carefully maintained and operating staff fully trained.

But remember, any form of radiation is invisible and symptoms of radiation poisoning can take time to occur. Radiation poisoning is rarely treatable and is extremely serious to most organic life. Use your RPA for best practice advice.

## Ammonia Refrigeration Plant

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Ammonia is a very effective refrigerant and is widely used in the meat processing industry. The HCFC refrigerant R22 is being phased out by 2015 as a result of the Montreal protocol on ozone-depleting gases. HCF refrigerants are not considered sustainable and are already banned in some countries and hydrocarbon-based refrigerant systems are unsuitable for large plants. So it is likely that ammonia refrigeration systems will become even more widespread.

Previously the Health and Safety Executive published guidance on ammonia refrigeration systems - Guidance Note PM 81: Safe Management of Ammonia Refrigeration Systems, HSE, 1995. The general information in this document is still applicable, but the document does not reflect more recent legal requirements such as the [Pressure Systems Safety Regulations 2000 \(PSSR\)](#) and [Dangerous Substances and Explosive Atmospheres Regulations 2002 \(DSEAR\)](#). HSE are currently in the process of drafting web-based advice to replace PM 81.

Ammonia is a highly toxic and reactive chemical. Its molecular structure consists of one nitrogen atom combined with three hydrogen atoms – NH<sub>3</sub>. It has a sharp, pungent odour, which fortunately means that it has good self-alarming properties. Liquid ammonia has a high compression ratio. Anhydrous ammonia boils at a temperature -33.3°C. The ratio of liquid to gas is 1:800, which means that 1 litre of liquid ammonia expands to form 800 litres of gas. A major ammonia spill is potentially disastrous because ammonia readily evaporates when exposed to air and can create explosive fire hazards. Concentrations of ammonia in air between 16 and 28% are flammable and can pose a risk of explosion. It dissolves in water to form highly corrosive ammonium hydroxide. It reacts strongly with acids and attacks copper and zinc as well as their alloys (including galvanized steel).

Because of its self-alarming property, normally people will try to flee to a safe area when they smell ammonia. There are however two separate scenarios that could cause significant risk. When an individual worker or a small group of workers are trapped in an area where there is no option for escape or when there is a major discharge of ammonia (e.g. as a result of catastrophic plant failure). In the latter case, the risk may extend both to other workers in the meat plant and to people who live and work in the neighbourhood of the plant.

The threshold for detecting ammonia in air by smell is around 25 parts per million. Levels of 700 ppm are extremely irritating but do not cause serious injury provided exposure is less than 1 hour. Levels above 2000 ppm may be fatal, and above 6000ppm death is almost instantaneous.

Basic safety is achieved by containing the ammonia within the refrigeration plant. Refrigeration plant rooms need to have suitable detection devices to detect leaks which activate emergency ventilation systems and shut plant down. Emergency plans are needed to deal with ammonia gas that is vented outside of the machinery room – e.g. escape routes and assembly points for people who may be affected taking account of wind direction. Ammonia gas at ambient temperatures is less dense than air so small leaks will quickly dispersed. Leaks of liquid ammonia can produce an aerosol with very low temperatures. This cold, dense aerosol will form a plume that can fall back to earth. Concentrations of ammonia inside the plume can be as high as 45,000 ppm.

Entry to confined areas such as plant room should be restricted to trained personnel. For larger installations training in the use of protective suits and self-contained breathing apparatus will be needed for both rescue and responding to major leaks. Arrangements must be made to make sure that trained staff are available at all times so that the plant can be shut down in the event of a major leak.

The [Pressure Systems Safety Regulations 2000](#) apply to those parts of the system where ammonia is liquified or circulated under pressure. Basically these impose duties on designers, suppliers, installers and users to prevent leaks from pressurised plant and pipework. For plant exceeding 25kW total installed compressor motor power, a written scheme for the periodic examination, by a competent person, of protective devices, pressure vessels and pipelines, and parts of pipework in which a defect may give rise to danger is needed. Written schemes will also be needed for any system where the pressure exceeds 0.5 Bar above atmospheric pressure. Bear in mind that for direct systems ammonia leaks from all the pipework will need to be included in the examination scheme. For indirect systems where the ammonia is used to cool glycol or similar liquids only the primary coolant pipework needs to be included.

In addition, the [Dangerous Substances and Explosive Atmospheres Regulations 2002](#) apply as far as areas where an explosive atmosphere may form. This requires control of the risk, identification of zones where explosive atmospheres may occur and instruction and training of staff.

The Institute of Refrigeration has produced a detailed code of practice for ammonia refrigeration systems which was revised in 2009 to take account of all the legal requirements.

The code includes advice on the physical properties of ammonia; design and installation of plant and systems; commissioning of new installations; testing, inspection and maintenance and decommissioning of plant. Appendices cover pressure and strength testing procedures; marking and name plate data; handling and storage of ammonia; more on commissioning new plant and on machinery room safety; sample documentation for inspection, maintenance and system operating logs and advice on stress corrosion cracking.

[Safety Code of Practice for Ammonia Refrigeration Systems REVISED FEB 2009](#),

HSE: Web-based guidance to replace Guidance Note PM8I should be available on the HSE website soon – <http://www.hse.gov.uk/>

## Cleaning Operations

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### INTRODUCTION

Cleaning of workplaces, plant and machinery is of prime importance in the meat trade for hygiene reasons. This note is not intended to give guidance on hygiene standards but to recommend the adoption of safe methods of achieving the hygiene required by other legislation or codes of practice.

### HAZARDS

- During cleaning operations machinery may need to be dismantled and guards removed. Serious injury can result from uncovenanted movement or deliberate running of machinery under these conditions.
- Machines incorporating heavy or sharp cutters present a handling risk to workers. Strains and falls as a result of incorrect handling of heavy items of plant are significant hazards.
- Steam and hot water used in cleaning create burning and scalding hazards. The source of steam may be direct injection pipes used to heat tanks of water, mixer valves or portable pressure washers. Hot water is handled via hoses or various containers such as bins, mobile baths, buckets and tanks. Serious burns may occur by contact with large quantities of hot water because of dangerous systems of work or inadequate protective clothing. A particular hazard is the use of incorrect equipment such as plastic buckets, which soften and detach from the handle at high temperature.
- There are dangers associated with electrical equipment in wet conditions, particularly if hosed down at high pressure.
- Certain chemicals used in cleaning operations may be harmful to health if incorrectly stored or used. Some chemicals become more hazardous when mixed than when used separately.
- To carry out satisfactory cleaning of plant, access may be needed to equipment or places not otherwise approached, for example, high level pipes, overhead conveyors or very large machines. Falls from height are a prime cause of fatal and major injuries.
- Persons entering confined spaces may be affected by harmful fumes/vapours or lack of oxygen.

### PRECAUTIONS

1. A responsible person should be in charge of all cleaning operations. They must be adequately trained and have sufficient knowledge and experience to enable them to supervise and control a system of working. Complex installations may need a written safe system of work for cleaning.
2. **Machinery Dismantling and Reassembly**  
Supervision should assess the requirements for the specific cleaning operation to be done, identify the potential hazards and the precautions necessary to avoid danger. Typical precautions might include:

#### Machine Isolation

If dismantling includes removal of guards, whether fixed in place or interlocked, the machine should be electrically isolated. It is not sufficient for the machine isolator to be switched to the off position. Some form of positive isolation should be provided, such as a facility on the isolator to enable it to be padlocked. Such a facility allows the use of securing hasps such as Islok or Scissorlok that enable several maintenance personnel to use their own personal padlock. Whilst any one padlock remains in

position the isolator cannot be moved to the on position. On smaller machines the plug may be simply removed from the socket.

**Reassembly:**

When cleaning is finished the person responsible for the operation should check that the work has been completed properly. All machine components, including guards should be replaced and in full working order. The operation of guards, interlocks, emergency stops and other controls should be checked.

3. **Handling Machine Components**

Where heavy or unwieldy components are to be moved arrangements should be made for safe handling. This might include providing lifting equipment for the operation or ensuring that adequate manpower is available.

Machines incorporating sharp cutters, e.g. slicers, should have suitable devices for safe handling during dismantling and cutter cleaning.

Persons required to handle heavy or unwieldy objects should be trained in handling procedures including the use of lifting equipment where appropriate. Safety footwear should be provided and worn.

4. **Safe Means of Access**

Where practicable permanent access and working platforms should be provided. Platforms should have a sound surface and be surrounded on open sides by a handrail, intermediate rail and toeboard.

Where scaffolding is used as a temporary working platform or means of access, it should be a sound structure. Guidance on scaffolding is contained in the [HSE General Access Scaffolds and Ladders CIS49](#).

Drain covers, manhole covers and any similar covers in floors should be replaced immediately after work has been completed. If openings are left unattended, suitable barriers are necessary to prevent persons tripping or falling.

Forklift trucks should only be used for access when fitted with a suitable working platform and in accordance with a safe system of work. Further advice is given in [HSE Guidance Note PM 28 - Working Platforms on Forklift Trucks](#).

Power operated mobile work platforms (extending work/access platforms, power access platforms, aerial work/access platforms or mobile work/access platforms are other descriptions) may be used during cleaning operations. Hazards associated with such equipment and the precautions necessary are contained in the HSE booklet, HS(G)19.

5. **Electrical Equipment**

Precautions should be taken to prevent ingress of water to electrical equipment. Employees using high-pressure jets should be instructed and supervised to minimise the risks both to the equipment and operators. It should be recognised that even protected electrical equipment is unlikely to withstand direct high pressure jetting and fogging.



Equipment used for the purpose, such as steam or water pressure cleaners, should be constructed and maintained to a high standard. Guidance on their use is given in [HSE Guidance Note PM 29 – Electrical Hazards from Steam/Water Pressure Cleaners](#).

6. **Chemical Safety**

The Control of Substances Hazardous to Health Regulations ([COSHH](#)) require an assessment of the risks to health posed by any hazardous substances so control measures can be selected applied and maintained to control those risks.

Management must obtain and keep information about hazardous chemicals. This information should include details about the potential hazards, the precautions to be taken, first aid action and the proper method of use. These details are available from the suppliers in a data sheet.

Any person who has to use harmful or toxic substances must be made aware of the hazards and instructed/trained in the appropriate precautions. Adequate supervision should be provided to ensure that the correct procedures are being followed.

Every chemical container must be clearly marked with its contents and correct method of use. Dispensing from bulk into other containers should only be permitted after the container has been thoroughly cleaned and re-marked to indicate the new contents. Old markings should be removed. The use of food containers for this purpose should be prohibited. In addition, chemicals should not be transferred by pouring direct from the container but should be transferred by the use of suitable dispensing equipment.

Mixtures of certain chemicals can produce toxic gases, which may be dangerous to persons and liable to contaminate the products. Violent chemical reactions may also occur. This can be a particular problem if incompatible chemicals mix in drains. Instructions for the proper use of the chemicals should be specified and the procedures monitored by supervision.

Supplies of acids and alkalis should be physically separated. Where Large quantities are kept, it may be appropriate to provide clearly marked separate storerooms.

Concentrates should be kept well away from water supplies and should be added to water not water to concentrate.

The recommended dilution rate should be observed, i.e. solutions should not be prepared at increased strength.

Protective clothing should be provided to minimise the risk of accidental splashing of the skin and eyes by cleaning chemical. These chemicals may be acidic or alkaline, both of which can be corrosive to skin and eyes or they may contain bleaches or solvents having a harmful chemical action on skin and eyes. Protective clothing supplied should be impervious to the chemical being used and will normally consist of apron, goggles and gloves in addition to overalls and wellington boots.

Eye wash bottles/drenching facilities should be provided at suitable locations.

**7. Entry into Confined Spaces:**

Serious accidents continue to occur whilst work is being done in confined spaces. The chief risk is of toxic gases or fumes inside the space to be entered. Typical spaces might include cookers, boilers, tanks, pits, sewers etc. There are specific regulations that must be complied with, [the Confined Spaces Regulations 1997](#) and there is an [HSE guidance leaflet IND \(G\) 258](#) aimed at employers and the self-employed who carry out work in confined spaces. It explains, simply, what action is necessary to meet the Regulations.

**8. Use of Steam and Hot Water**

Employees working with steam or hot water should receive training and information about the potential hazards.

All taps, valves, connections and hoses should be maintained in good repair.

Live steam should never be discharged from a hosepipe.

Steam mixer valves should display clear instructions about correct use, e.g. always turn on water before steam. Controls should be clearly marked.

Preference should be given to the installation of calorifiers to the water if steam is utilised.

Mobile tanks or baths should not be filled beyond a safe level in order to prevent spilling and splashing.

Plastic buckets or containers not designed for carrying hot water should never be used for this purpose.

Wherever possible, hot water should be dispensed from tanks and vats by means of taps or valves. Never fill buckets from a tank or other vessel if this involves lifting the bucket above chest height.

The correct protective clothing should be provided and worn when working with steam or hot water, namely long wellington boots and a waterproof apron, which covers the front of the body and overlaps the boots.

Hot water hoses should never be directed at other persons.

Areas being cleaned should be clear of all personnel before swilling or hosing with water.

Water or steam hoses should not be directed at electrical equipment.

## Insect Killers

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### DESCRIPTION

These devices are ultra violet lamps that attract insects and then kill them by contact with an electrical grid charged at high voltage. Dead insects are caught in a tray, which has to be periodically emptied.

### HAZARDS

- Electric shock
- Ultra violet radiation

### PRECAUTIONS

#### 1. **Electrical**

The equipment should comply with the [Electrical Equipment Safety Regulations 1994](#) and be made to BS EN 60335-2-59:2003 Safety of household and similar electrical appliances.

Contact with hazardous live parts of the grid is prevented by ensuring that the grid is electrically isolated from other circuits or that the earth side is outermost or that the supply is current limited.

The fly tray should be removable without exposure to live internal parts. This should be achieved by means of fixed mechanical guards or an interlocked access hatch.

The equipment should be manufactured from materials that can withstand sustained exposure to ultra violet light. Certain materials (e.g. PVC and rubber) may become brittle and have been known to cause fires in the fly tray.

Some models, and in particular those of the industrial type which have no grid guard, must only be installed by competent persons and placed out of reach to be safe by position.

Danger notices should be fixed at each unit warning that the equipment should be isolated prior to any work on it and the device should be easy to isolate by being plugged into a fused socket for instance.

#### 2. **UV**

Provided the device is fitted with a lamp that produces almost entirely UVA, the radiation hazard is negligible.

It is essential that replacement lamps of the correct type be fitted. Lamps that produce UVB and UVC radiation cause skin reddening and eye irritation.

## Q Fever

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### BACKGROUND

Diseases transmitted from animals to humans are known as zoonoses.

Q fever is a highly infective zoonotic disease, caused by a micro-organism called *Coxiella burnetii*. This organism has a worldwide distribution among livestock and domestic ruminants. Sheep, cattle and goats are the most frequent source of human infection, although pets such as dogs and cats may also be a source. Infections in animals are generally asymptomatic (although it can cause abortion in cattle and sheep), and it is not considered to cause economically significant animal disease so there appears to be little effort to control the infection in farm animals. Human infection is divided into asymptomatic, acute and chronic Q fever with acute symptoms usually occurring two or three weeks after exposure.

Acute infection is usually characterised by an influenza-like illness, with varying degrees of pneumonia, or hepatitis. It can be easily misdiagnosed for other flu-like illness. Fever and fatigue are the most prominent manifestations whilst headache and muscle pains are also reported. In a small number of cases, chronic Q fever can develop and this is potentially more serious with high fatality rates if left untreated. This is often associated with underlying health issues or pre-existing conditions and generally follows within 6 months (and up to several years) after acute infection. The commonest complication is endocarditis (a condition affecting the valves of the heart). Cases of chronic fatigue have also been reported. Q fever is strongly associated with certain occupations e.g. farmers, abattoir and meat processing and packaging workers although the true incidence is difficult to determine because many cases are mild or show no symptoms. Pregnant workers may be particularly at risk. In the UK approximately 70 cases are reported annually. However, in the summer of 2006 an outbreak occurred in a Scottish meat processing plant resulting in over 100 cases of acute Q fever.

### TRANSMISSION

Inhalation of infective aerosols or contaminated dust is the main route of transmission to man, either from direct exposure to infected tissues (eg birth products) or indirectly through contaminated materials. Humans are at greatest risk of exposure where animals are handled when giving birth, handling birth products or during abortions because large numbers of *Coxiella burnetii* may be present in the birth fluids or the placenta of infected animals. They may also be present in faeces, urine, and raw (untreated) milk. Outbreaks have occurred where wind-borne transmission of infective spores has taken place. The organism can survive for many years as a spore-like form before being inhaled and causing infection.

*Coxiella burnetii* may also gain entry to the body by transmission through cuts in the skin. Experimentally, only small numbers of organisms are required to establish an infection. Person-to-person spread does not generally occur.

### LEGAL REQUIREMENTS

Exposure to zoonoses such as Q fever need to be minimised as required by [The Control of Substances Hazardous to Health Regulations \(COSHH\) 2002 \(as amended\)](#). Other relevant legal requirements are [The Management of Health and Safety at Work Regulations 1999 \(MHSWR\)](#) and [The Health and Safety at Work etc Act 1974](#).

COSHH requires employers and self-employed people to:

- assess the risks to health from work activities which involve potential exposure to a hazardous substance (eg a micro-organism such as *Coxiella burnetii*);
- prevent or, where this is not reasonably practicable, adequately control exposure to the hazardous substances;
- introduce and maintain control measures;
- inform, instruct and train employees about the risks and precautions to be taken;
- regularly review risk assessments and the effectiveness of control measures.

For more detailed information about the general requirements of COSHH see the [BMIPA Guidance Note GN I-4](#).

### PREVENTION

As Q fever is mainly an occupational disease, prevention and control measures need to be directed at those occupational groups and environments at risk. Employers will need to ensure that their assessments made under COSHH and MHSWR address the risks arising from Q fever, so that suitable control measures can be implemented to protect the health of their employees and others. When developing and implementing a risk management program for Q fever, it is important to consult with health and safety representatives and employees, as they are often a valuable resource for determining the suitability of control measures.

### PREVENTATIVE MEASURES

Regular cleaning and disinfection of lairages and livestock reception areas at abattoirs is an essential proactive precaution to minimise accumulation of contaminated material from Q Fever organism shedding by animals. Appropriate arrangements must be made for the collection, handling and disposal of any potentially high-risk materials. The greatest risk of exposure with livestock is associated with animals giving birth, handling birth products (eg placenta, foetal membranes, and aborted foetuses) because large numbers of *Coxiella burnetii* may be present in the birth fluids or the placenta of infected animals.

Access to lairages should be restricted to authorised personnel only. **Where access to Q fever risk areas is required, minimise the time spent in these areas.**

Ventilation systems and their potential for spreading contaminated air and/or distribution of spores should be carefully assessed. Dispersal of the micro-organism may be facilitated by an outward flow of air from lairages, eg produced by supply fans creating a positive pressure within lairage buildings, thus forcing potentially polluted air to escape to areas frequented by workers. Where possible, plan and position lairages and their ventilation systems away from communal areas, to reduce risks. Maintenance regimes for ventilation systems will also need careful planning and implementation. Consideration should be given to the location and operation of fans, ducting and deflectors, and the use of air scrubbers.

Workers should be provided with information and training on Q fever, which should include;

- Symptoms associated with Q fever
- How people can become infected
- Use of control measures necessary to adequately control exposure.
- Action to take in the event of an outbreak (or suspected case)
- Any other information as determined by the risk assessment or COSHH assessment

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Your COSHH assessment will help you decide when and where PPE is needed. Remember that you should only consider using PPE after you have considered other control measures. It is likely that the provision of adequate and suitable PPE will be necessary as an adjunct to other measures. However, the nature of your work may mean that PPE is sometimes a necessary option.

Ensure that personal clothing is stored away from work clothing and that employees do not take contaminated work clothing out of the workplace, in order to reduce the risk of contamination.

Examples:

- always wear PPE when handling afterbirths or birth products. Suitable PPE will include a coverall, footwear such as wellington boots, gloves and respiratory protection (EN149 -FFP3).
- use face protection (for eyes and mouth) if there is a risk of splashing from urine or placental fluids. Suitable protection will include a face shield to BS EN 166: 2002.
- Make sure that whatever PPE you use is suitable, properly maintained, cleaned and decontaminated after use, (if re-usable), stored in a clean area and CE marked.

### GOOD OCCUPATIONAL HYGIENE

Any work with animals inevitably involves contact with dung and urine, which may contain disease-causing organisms including *Coxiella burnetii*. Personal hygiene is therefore vitally important. Employers will need to provide washing facilities wherever staff or visitors work with animals, (to include, clean running water, soap or hand cleaner and towels). There should be adequate segregation of welfare and work areas to prevent cross contamination. Make sure all staff:

- wash hands thoroughly before eating, drinking, smoking, going to the toilet, and at the end of the shift and in the event that they become contaminated with animal tissue or fluids.
- wash cuts and grazes immediately with soap and running water;
- cover any new and existing wounds with a waterproof dressing before beginning work. An effective first aid programme should ensure that any open wounds are treated quickly.
- are prohibited from eating, drinking, or smoking in animal holding or processing facilities

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### CLEANING, DISINFECTION AND WASTE DISPOSAL PROCEDURES

Spills of potentially contaminated material should be dealt with immediately using hypochlorite (5000 ppm available chlorine), 2% formaldehyde, 1% lysol, 5% hydrogen peroxide, 70% ethanol or 5% chloroform. These chemicals are believed to be effective against *Coxiella burnetii*.

Such products can also form the basis of a proactive cleaning regime and will also be subject to the COSHH regulations. *Coxiella burnetii* spores are resistant to normal disinfection products and dilute bleach etc.

Decontamination of large areas using a pressure washer should only be undertaken if appropriate precautions are taken to prevent further air borne spread which may occur by the use of such equipment. Unauthorised staff should also be excluded from these areas when cleaning is in progress. Any doors, shutters etc should be closed to limit aerosol spread. Any high risk materials/significant quantities of organic debris should be removed prior to pressure washing. Use of high pressure equipment may create inhalable aerosols containing infectious material so operators should be provided with suitable PPE to reduce the risk of exposure. Low pressure application may reduce the risk.

Personnel entering an area where infection has been confirmed or suspected should wear appropriate biologically resistant coveralls with outer gloves and boots (for example a CRI, PRPS or gas-tight suit) and a correctly fitting high efficacy particulate respirator of FFP3 standard at all times. RPE should be face-fit tested for each individual as necessary.

A number of outbreaks have demonstrated the possibility of spread of the infection on workers clothing, hay, straw, footwear, etc so these items will need to be treated as contaminated waste and disposed of accordingly.

Disinfection of exposed persons includes:

- Removal of contaminated clothing and possessions – to be double bagged and clearly marked until exposure has been ruled out. If *Coxiella burnetii* is confirmed, all contaminated material should be incinerated or autoclaved by a specialist waste contractor.
- Exposed persons should wash/shower thoroughly with soap and water
- Full PPE (as described above) should be worn when handling contaminated items.

An ongoing monitoring program should be implemented to ensure the control measures continue to operate effectively.

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## SCREENING

You should ask employees, and people you are considering employing, about any pre-existing health conditions they have which may mean that they are more likely to contract Q fever or that might increase the severity of it should they become infected. This should form part of pre-employment assessment. For example, individuals are likely to be at an increased level of risk if they:

- have a compromised immune system
- suffer from existing medical conditions such as valvular or vascular disease
- have had their spleen removed;
- are in receipt of transplanted organs
- are pregnant

Q fever infection in pregnancy may result in abortions, premature deliveries, low birth weights and stillbirths. Subsequent pregnancies may be at risk due to the possibility of a chronic infection in the mother. Note that [The Management of Health and Safety at Work Regulations](#) require employers to undertake a more detailed and specific assessment on risks to pregnant workers so that appropriate action can be taken. For example, pregnant women should avoid close contact with sheep and lambs during the lambing season and avoid exposure to these animals, cattle or goats which are in the process of giving birth or in the post-partum period.

All of the above conditions are likely to make the individuals concerned more vulnerable to infection, and employers should consider carefully whether they allow such people to work with animals or in areas where there is an increased risk of infection. Therefore, it may be necessary to reallocate work for high-risk groups of workers.

## DIAGNOSES

Where individuals are suffering from the symptoms associated with Q fever, they should consult a doctor without delay. The doctor should be informed about the working environment (abattoir, meat processing or packaging plant) and work undertaken (eg contact with farm livestock). Q fever is diagnosed by a blood test but a positive result is obtained two to four weeks after onset of the illness. It is good practice for workers to carry the BMPA zoonoses pocket card and to take this with them when visiting the doctor.

In the event of an outbreak, individuals in the exposed/infected zone may be treated effectively with antibiotics. At present there is no vaccine against Q fever commercially available or licensed for use in the UK.

## HEALTH AND SAFETY ASSISTANCE – THE NEED FOR COMPETENT ADVICE

Employers are required to appoint one or more competent persons to assist in undertaking the measures required to comply with health and safety law. Such persons will need to have a high level of knowledge and experience relating to the issues discussed in this guidance. For example, the Health Protection Agency or Veterinary Laboratory Agency may be able to offer advice and assistance on Q fever (see contact details below).



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## FURTHER INFORMATION

### From HSE:

**Control of Substances Hazardous to Health (4th Edition) - L5,**  
**New and Expectant Mothers at Work – A Guide for Employers – HSG122**  
**Selection, Use and Maintenance of Respiratory Protective Equipment:**  
**A Practical Guide -HSG53**  
**Common zoonoses in agriculture - Agriculture Information Sheet No 2 (revised),**

HSE Books may be obtained by telephone (01787 881165) or from  
[www.hse.gov.uk](http://www.hse.gov.uk) or [www.hsebooks.com](http://www.hsebooks.com)

The Health Protection Agency has useful information on Q fever.  
See [www.hpa.org.uk/infections/topics\\_az/zoonoses/q\\_fever/default.htm](http://www.hpa.org.uk/infections/topics_az/zoonoses/q_fever/default.htm)

### Other useful websites:

<http://www.hps.scot.nhs.uk/>  
[www.defra.gov.uk](http://www.defra.gov.uk)

<http://vla.defra.gov.uk/> for the Veterinary Laboratories Agency (VLA) –  
an executive agency of DEFRA

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## Q FEVER – BMIPA QUESTION AND ANSWER BRIEF

### What is Q Fever?

Q (Query) fever is a highly infectious zoonosis (an infection transmitted from animals to man). It is so called because for years the cause was unknown. However, we now know that Q fever is caused by the *Coxiella burnetii* micro-organism, and this is widespread globally among livestock and domestic ruminants. Sheep, cattle and goats are the most frequent source of human infection, although pets such as dogs and cats may also be a source. The peak incidence of infection in humans in the UK is associated with the spring/early summer lambing season.

### How Common is Q Fever?

*Coxiella burnetii* has a worldwide distribution. In humans, Q fever is strongly associated with certain occupations e.g. farmers, abattoir and meat processing and packaging workers. However, other occupational groups such as veterinary staff and livestock hauliers may also be at risk. In the UK, about 70 cases of Q fever are reported each year. This probably underestimates the true incidence of Q fever because many cases are mild or show no symptoms.

### What are the Symptoms?

Around half the people infected with Q fever show symptoms of acute infection usually characterised by an influenza-like-illness, with varying degrees of pneumonia, or hepatitis. Fever and fatigue are the most prominent manifestations and headache is common. Muscle pains are also reported.

Since Q fever patients may exhibit a number of non-specific symptoms it may be difficult for GP's to distinguish it clinically from viral illnesses or other causes of atypical pneumonia. Full recovery usually occurs, but chronic Q fever can be more serious with high fatality rates if left untreated. It generally follows one to 18 months (average 6 months) after acute infection and the commonest complication is endocarditis (a condition affecting the heart). Most patients who develop Q fever have pre-existing medical conditions, such as valvular heart disease, cancer, kidney disease, or may have a compromised immune system. Transplant patients are also at risk of developing chronic Q fever.

Infection may also result in abortions, premature deliveries, low birth weights and stillbirths in pregnant women.

Q fever is diagnosed by a blood test, but a positive result is obtained two to four weeks after onset of the illness.

#### How Do You Catch Q Fever?

Inhalation is the main route of transmission to man, either from direct exposure to infected tissues (eg birth products) or indirectly through contaminated materials. Humans are at greatest risk of exposure where animals are handled when giving birth, handling birth products or during abortions because large numbers of *Coxiella burnetii* may be present in the birth fluids or the placenta of infected animals. They may also be present in faeces, urine or raw (untreated) milk. Outbreaks have occurred where wind-borne transmission of infective spores has taken place. The organism can survive for many years as a spore like form before being inhaled and causing infection.

*Coxiella burnetii* may also gain entry to the body by transmission through cuts in the skin. Only small numbers of organisms are required to establish an infection. Person-to-person spread does not generally occur.

#### How Long Can You have the Infection Before Developing Symptoms?

The incubation period is between 7 and 30 days, depending on the infecting dose, route of exposure and age of the patient. Patients developing chronic infections, such as endocarditis, may remain infected without showing symptoms; however relapses may occur months/years in the future.

#### How is Q Fever Treated?

Q fever can be treated by using antibiotics such as doxycycline or tetracycline for 7-14 days, with treatment continued for at least three days after remission of fever. Antibiotics are less effective in chronic disease and despite improved results with combination therapy (doxycycline and chloroquine) relapse rates of over 50% are still seen and a minimum of 3 years treatment is recommended.

Women who develop Q fever in pregnancy may be treated with co-trimoxazole but professional medical advice should always be sought.

#### Can Q Fever be Prevented?

As Q fever is mainly an occupational disease, prevention and control measures need to be directed at those occupational groups and environments at risk.

Employers will need to ensure that their risk assessments/COSHH assessments address the potential risks arising from zoonoses including Q fever, so that suitable control measures can be implemented. Special requirements for assessment apply where pregnant workers or young people are employed.

Workers should receive information, instructions and training in order to increase their level of awareness and to ensure that control measures and procedures are followed. For example, the BMPA zoonoses pocket card is a useful tool to raise awareness and staff should be encouraged to take the card with them on visits to their GP.

In the event of an outbreak, individuals in the exposed/infected zone can be treated with antibiotics given a week after exposure.

At present there is no vaccine against Q fever available in the UK.

#### **What Cleaning, Disinfection and Waste Disposal Procedures are Effective?**

Spills of potentially contaminated material should be dealt with immediately using hypochlorite (5000 ppm available chlorine), 2% formaldehyde, 1% lysol, 5% hydrogen peroxide, 70% ethanol or 5% chloroform. These chemicals are believed to be effective against *coxiella burnetii*.

Such products can form the basis of a cleaning regime and will require assessment under COSHH. *Coxiella burnetii* spores are resistant to normal disinfection products, dilute bleach etc.

Decontamination of large areas using a pressure washer should only be undertaken if appropriate precautions are taken to prevent further air borne spread which may occur by the use of such equipment.

Personnel entering an area where infection has been confirmed or suspected should wear appropriate biologically resistant coveralls with outer gloves and boots (for example a CR1, PRPS or gas-tight suit) and a correctly fitting high efficacy particulate respirator of FFP3 standard at all times. RPE should be face-fit tested for each individual.

A number of outbreaks have demonstrated the possibility of spread of the infection on workers clothing, hay, straw, footwear, etc so these items will need to be treated as contaminated waste and disposed of accordingly.

Disinfection of exposed persons includes:

- Removal of contaminated clothing and possessions – to be double bagged and clearly marked until exposure has been ruled out. If *coxiella burnetii* is confirmed, all contaminated material should be incinerated or autoclaved.
- Exposed persons should wash/shower thoroughly with soap and water
- Full PPE should be worn when handling contaminated items

#### **Is Health Screening Necessary for Workers?**

Certain occupations and individuals may be particularly at risk as described above. In particular, pregnant women should not be permitted to carry out work where they might be exposed to infection. Staff with pre-existing medical conditions that put them at an elevated level of risk should also be excluded where necessary. Therefore, pre-employment screening should be considered an important measure to reduce risk.

#### **Is it Possible to Identify Animals with Q Fever?**

Infections in animals are generally asymptomatic, however in mammals infection can result in late stage abortion, stillbirths or delivery of weak offspring. It is not considered to cause economically significant animal disease and therefore there appears to be little effort to control the infection in farm animals. It is not generally considered pathogenic.

#### **Where can I Obtain More Information About Q Fever?**

The Health Protection Agency website at [www.hpa.org.uk](http://www.hpa.org.uk) and the agriculture and/or food pages of the Health and Safety Executive website at [www.hse.gov.uk](http://www.hse.gov.uk)

## Zoonotic Hazards for Workers in Pig Abattoirs (Revised November 2014)

Name	Risk to Humans	Host	Symptoms in humans	Incidence	Transmission	Prevention
Anthrax (B. Anthracis)	Most likely abscess, but can cause death. Incidence very low. Low risk.	All mammals	Abscesses, pneumonia, intestinal infection, septicaemia	Countrywide, but especially the Neene Valley in Derbyshire. Not often found at ante mortem inspection	Inhalation, inoculation or ingestion of spores. The risk of infection to human contacts from a confirmed animal case is thought to be very low and limited to cutaneous anthrax, which is readily diagnosed and easily treated. Pneumonic anthrax, due to the inhalation of organisms, is very unlikely to be a risk from animal infections under natural conditions given the nature of the exposure, which is likely to be limited to contact with the animal or its fluids and not to aerosolised anthrax spores.	Hygiene. Avoiding contact with blood or soil known to be infected. Investigating all cattle deaths in the lairage for Anthrax
Bovine Tuberculosis (M.Bovis)	Very rare in pigs; risk low to people working in pig abattoirs.	Cattle, occasionally pigs and deer.	Fever, night sweats, fatigue, cough lasting more than 3 weeks.	Common in the South West, Wales and South West Scotland.	Inhalation or ingestion of bacteria.	Avoid incising obviously infected lymph nodes. Personal hygiene
Campylobacter (Campylobacter spp)	High incidence, medium impact: Medium risk	All species	Bloody diarrhoea which may mimic appendicitis	Common	Contact with infected faeces	Personal hygiene, not wearing work clothes while eating or drinking.
Clostridial infections (Clostridia spp)	Low incidence, high impact: Medium risk	All species	Food poisoning, tetanus, botulism, septicaemia, gangrene.	Low	Infections through cuts (tetanus, gangrene, septicaemia) ingestion (Botulism, food poisoning)	Personal hygiene, not wearing work clothes while eating or drinking. Clean and cover all cuts.
Erysipelas (E. Rhusiopathiae)	High incidence, low impact: Medium risk	Mammals, but especially pigs	Non specific skin lesions, arthritis, occasionally septicaemia	Common	Contact with infected faeces	Keep cuts covered, personal hygiene and wearing PPE.
Hepatitis E	Low incidence and low impact in most people mean low risk. However, high impact in pregnant women means medium risk to this group.	All species	Jaundice, pyrexia, anorexia, fatigue and abdominal pain.	180 in UK in 2009, of which 22 were travel related	Contamination of food or water supply with faeces and directly from undercooked pig meat.	Hygiene, PPE.
Leptospirosis (Leptospira spp.)	High incidence, medium impact: Medium risk	Dairy cattle, rats	Flu like symptoms	About 50 cases in people each year	Contact with infected urine, contaminated watercourses	Personal hygiene, using first aid dressings, keeping wounds clean. Good pest control.
Listeriosis (L.Monocytogenes)	Low incidence, high impact: Medium risk	Environmental, mainly but possible from infected animals	Mild flu like symptoms to septicaemia and meningitis	About 150 cases in humans each year in the UK, of which just under 1/3 are fatal	Contact with the organism in infected sites or by injection.	Personal hygiene. Avoiding high risk products, e.g. cooked meats and some cheeses

Name	Risk to Humans	Host	Symptoms in humans	Incidence	Transmission	Prevention
Lyme disease (B. Burgofii)	Low likelihood, medium impact: Medium/low risk	From infected ticks	Skin lesions, possible endocarditis and arthritis	About 300 cases in people in the UK per, and increasing as the climate warms up.	Attachment by infected tick.	Avoid attachment by ticks which have fed on infected animals
Pasteurella spp	Low incidence, medium impact, low risk	Most mammalian species as a secondary invader in cases of respiratory illness	Can cause peritonitis and endocarditis, but usually localised infection as a result of a bite	489 confirmed cases in the UK in 2008	Usually contracted from bites	Keep cuts covered. Avoid being bitten in the lairage.
Q Fever (Coxiella Burnetii)	Medium likelihood, medium impact: Medium risk	From dust in yards where infected animals held. Tissues from freshly dead animals area potential hazard as well	Flu like symptoms, occasionally pneumonia. Rarely can cause death	Seen in outbreaks in abattoir workers in the UK and in Australia	Inhalation of dusts and aerosols from infected material	Advise the operator to damp down the lairage if it becomes dusty. Wear masks in dusty conditions in lairages. Avoid fan exhaust from lairages going into air intake in rooms where people are working. Personal hygiene.
Rabies	Negligible likelihood, high impact: Low risk	Mammals	Pharyngeal paralysis, generalised paralysis death	Exotic to UK	Bites	If outbreak in UK, OV's to be vaccinated.
Ringworm	High likelihood, low impact: Medium risk	Mammals	Erythematous pruritic lesions, sometimes circular with a characteristic red raised ring, grey, scaly and hairless in the centre	Common in young calves.	From infected animals and fomites	Personal hygiene, changing clothes before eating and drinking.
Salmonella	Medium likelihood high impact, high risk	Mammals	Bloody diarrhoea, septicaemia, death.	Over 500,000 cases in people in the UK each year	75% considered to be from poultry and eggs. Oral faecal transmission and contaminated foodstuffs.	Good personal hygiene
Streptococcus Suis	Low likelihood, high impact: Medium risk	Pigs	Septicaemia, toxemia, endocarditis, arthritis death	2-3 cases per year. Last death in UK 1999	In pigs from tonsils and aerosol spread. In people through infected cuts	Keeping cuts covered
Swine Flu			No pig to human	transmission seen in the	UK ever. Risk low.	

8. Zoonotic Diseases, GN 8-2  
Pigs and humans, and occasionally other animals, such as dog and a cheetah

Flu symptoms, pulmonary oedema, death

H1N1 has not been found in pigs in the UK

Aerosol. Pig meat is considered safe to eat.

Not applicable.



Name	Risk to Humans	Host	Symptoms in humans	Incidence	Transmission	Prevention
Toxoplasmosis	Medium likelihood, medium impact. Medium risk	Cats definitive host, most mammals intermediate hosts	Transient muscle pain and flu like symptoms. Can cause abortion in pregnant women and animals		Cats are the definitive host where the parasite reproduces in the intestines, shedding oocysts on to pasture. These infect intermediate hosts where they develop into tachyzoites then encyst in muscle tissues as bradyzoites.	Avoid eating undercooked pig meat, prevention of meat getting into mouth with good personal hygiene.
Verocytic E Coli 0157	Medium likelihood, high impact: Medium/high risk	Cattle and sheep mainly, but not restricted to these species	Diarrhoea, toxicosis and occasionally death	Occurs in a low percentage of all farm livestock	Oral-faecal transmission	Good personal hygiene. Removing protective clothing before eating or drinking.



## Bovine Tuberculosis (bTB) (New Guidance Note August 2018)

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### BACKGROUND

Bovine tuberculosis (bTB) is a bacterial disease of humans and animals. In the UK it is most commonly found in cattle, deer and badgers, but is also found in alpacas, llamas and cats. The current risk of bTB in humans in the UK is very low, accounting for less than 1% of all human TB cases. The Advisory Committee on Dangerous Pathogens, *Mycobacterium bovis*, Working Group<sup>1</sup> has assessed that the risk to abattoir workers in reactor plants as low and that the risk to non-reactor workers as very low. That said, over recent years rates have been rising in the UK cattle herd and the disease is endemic in the badger population, particularly in South West England. Although transmission to people is rare, in 2013 an abattoir worker died from what was later ruled by a Coroner<sup>2</sup> to be occupationally acquired bTB.

### ORGANISM

BTB is caused by the *Mycobacterium bovis* bacterium, which is closely related to the bacterium that is the most common cause of TB in people. Like human TB, bTB is primarily a respiratory disease that affects the airways and lungs. The incubation period is generally several months, although the disease can remain dormant and become active again many years later. As with other harmful bacterium to humans, the bTB bacterium is of particular risk to a person with a compromised immune system.

The clinical symptoms of bTB are similar to other forms of TB and can include a persistent cough, fever and weight loss. Anyone with these symptoms who has been in contact with cattle or their by-products should seek medical attention. BTB can be confirmed by laboratory tests and is treated with a six-month course of antibiotics.

### TRANSMISSION ROUTES

BTB can be passed between animals, from animals to humans and between humans. Human transmission can result from hand to mouth contact, by consuming unpasteurised milk, from bacterium wound penetration or inhalation of aerosolised bacteria. Inhalation is possible through close contact with infected live animals or from bacterium emitted from incised bTB lesions post mortem which could be aerosolised through work process.

### RISK ASSESSMENT

As a dangerous pathogen, potential exposure to bTb falls under the Control of Substances Hazardous to Health Regulations 2002 (as amended 2004) (COSHH). *Mycobacterium bovis* bacterium is classified as a hazard group 3 biological agent. As such, a COSHH assessment should be conducted on abattoir and lairage operations looking for potential exposure points and transmission routes in both reactor and non-reactor abattoirs. The assessment should consider the number of reactor animals being processed and the number of post mortem cases being confirmed after laboratory analysis. It is recommended that these assessments be reviewed every six months.

<sup>1</sup> <http://www.hse.gov.uk/biosafety/acdp-m-bovis-working-group.pdf>

<sup>2</sup> On the balance of probabilities.

### OCCUPATIONAL RISKS TO BOVINE MEAT WORKERS

The Advisory Committee on Dangerous Pathogens, *Mycobacterium bovis*, Working Group<sup>3</sup> has systematically researched the occupational risk to workers acquiring bTB through both beef reactor and non-reactor processing facilities. Taking into account already documented general good practice in GN 8-1<sup>4</sup> for guarding against zoonotic infection, the working group made the following additional recommendations:

1. Existing guidance in the Green Book, which recommends that unvaccinated tuberculin-negative abattoir workers and veterinary staff under the age of 35 receive the BCG vaccination, should be followed.

*Historically children in the UK have been inoculated against TB at school – known commonly as the BCG jab. In recent years the inoculation of children at school has stopped. At the time of writing, due to a national shortage, this vaccine is not available upon request through the NHS to help guard against potential occupational exposure. Routine checks regarding the availability of the vaccine should be made through occupational health or local health care providers. When in a position to provide the BCG to staff, any declaration of pre-existing inoculations should be confirmed by a qualified clinician or occupational health provider.*

2. COSHH regulations and guidance from PHE and ACDP (Advisory Committee on Dangerous Pathogens, 2003, Public Health England, 2014), which state that employers should provide suitable health surveillance, should be followed.

*As with some other workplace hazards there is not a published health surveillance standard that, if duty holders met, would enable them to show compliance with COSHH. This is because the onset of TB is influenced by various individual/personal risk factors, including exposure to and susceptibility to TB. The basis of any suitable health surveillance programme should therefore be to check on susceptibility, likely exposure and the other personal risk factors.*

*In reactor abattoirs all staff, whether existing or new, should be screened for pre-existing TB.*

*As part of a rolling surveillance programme the following should be carried out:*

- *Reminders of bTB symptoms and the need for prompt reporting by employees who are in regular contact with reactor cattle or have worked with reactor cattle previously.*
- *Annual signs and symptoms enquiry via a questionnaire.*
- *Where employees are identified as being HIV positive or as having any immuno-compromising illnesses, additional controls and precautions and higher level of surveillance will be necessary.*

<sup>3</sup> <http://www.hse.gov.uk/biosafety/acdp-m-bovis-working-group.pdf>

<sup>4</sup> Zoonotic Diseases.

- *Health surveillance to be continued after potential exposure to Mycobacterium bovis bacterium has ceased (whilst employment continues) as health effects can be anticipated after a latent period.*
  - *Arrangements for action to be taken if bTB is identified during health surveillance.*
3. *In establishments where the operator stands in front of the animal during the process of stunning, RPE should be used in reactor abattoirs and considered in the LRA<sup>5</sup> in non-reactor abattoirs.*
  4. *During removal, dressing and inspection of the head, RPE and cut-resistant gloves should be used in reactor abattoirs and considered in the LRA in non-reactor abattoirs.*

*For non-reactor abattoirs, as soon as a potential lesion is identified in the head the person inspecting should step away and work to defined system whereby the line is stopped, departmental supervisors informed and those identified by risk assessment instructed to don RPE for that particular animal.*

5. *Cut-resistant gloves should be used during inspection of the green offal and associated lymph nodes.*
6. *When inspecting the pluck, RPE and cut-resistant gloves should be used in reactor abattoirs, and RPE should be considered in the LRA in non-reactor abattoirs.*

*For non-reactor abattoirs, as soon as a potential lesion is identified in the pluck the person inspecting should step away and work to defined system whereby the line is stopped, departmental supervisors informed and those identified by risk assessment instructed to don RPE for that particular animal.*

7. *During wash down<sup>6</sup> at the end of each slaughter session, RPE should be used in reactor abattoirs and considered in the LRA in non-reactor abattoirs.*

Risk assessment should consider the cleaning arrangements during production are adequate to prevent cross contamination should a potential bTB lesion be removed for testing. When a reactor animal has been processed, or a potential bTB lesion has been removed for testing, post production signage should be placed on all access route doors warning that RPE is required for end of production full wash down.

### RESPIRATORY PROTECTIVE EQUIPMENT (RPE)

As guidance note GN 2-6<sup>7</sup> outlines, there are a wide variety of RPE and differing degrees of protection depending on the hazard and exposure levels. As a minimum, disposable FFP3 masks offer suitable protection during on line production although its suitability for post-production wash down should be assessed from a view of potential water/chemical contamination. Face fit testing should be carried out by suitably qualified people in order to ensure the mask can be effectively fitted to the operators face and the operator trained in the correct fitting, inspection and maintenance of the RPE to be used.

<sup>5</sup> Local Risk Assessment.

<sup>6</sup> For wash down purposes the working committee made note of the fact that there wasn't currently a disinfectant which is both food safe and approved for guarding against the bTB bacterium.

<sup>7</sup> Personal Protective Equipment (PPE) in the Meat Industry.

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### OVERALLS AND GLOVES

If a potential bTB lesion has been identified and removed for analysis, at the next scheduled rest break, any employee who was required to wear RPE would be recommended to change their overalls for a freshly laundered set. Likewise, any disposable gloves should be washed, removed and placed in the bin as normal.

Potentially contaminated overalls should be placed into an appropriately marked biohazard bag or receptacle. Arrangements should be made with your laundry supplier for the uplift of such laundry. If washing cut resistant gloves in-house, again these should be bagged appropriately and disposable gloves worn when handling into the washing machine. Again, the segregation of cut resistant gloves would be limited to the people who had to wear RPE.

### CONSULTATION AND COMMUNICATION

It is essential that all affected parties are made aware of the control measures and why they are required. To ensure that there is no confusion or conflict with control measures, the Food Business Operator must ensure that the Food Standards Agency and other affected parties are duly aware of each other's risk assessments and safe working practices when managing this risk. It is essential during the monitoring stage that any findings are brought to all concerned and that control measures are reviewed regularly.

### RECORD KEEPING

It is important to ensure that health surveillance records are kept confidential and these must be secure. Risk assessments, training records, safe working practices, face fit test records should all be kept as part of the management system and reviewed regularly. It is also essential that a log is kept of when a suspected bTB reactor is identified in the abattoir, so you can monitor who may have been exposed and use this as part of your risk assessment review.

## Other useful publications and guidance

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A reference list of relevant publications and guidance has been included in individual notes where relevant. In addition the following publications may be helpful.

### HSE Publications:

#### Slips and Trips eLearning Package

- HSG 196 Moving food and drink. Manual handling case studies
- HSG 232 Sound solutions for the food and drink industries
- HSG 252 A Recipe for Safety

#### These publications are available from

HSE Books,  
PO Box 1999,  
Sudbury,  
Suffolk CO10 2WA.  
Tel: 01787 881165

#### Food Information Sheets (FIS)

available on the HSE website <http://www.hse.gov.uk/index.htm>

- FIS7 An index of H&S guidance for the food and drink industries
- FIS22 Preventing slips and trips in the food and drink industries
- FIS23 Injuries and ill health caused by handling
- FIS24 Hygienic design for machinery in food and drink industries
- FIS25 Safeguarding flat belt conveyors
- FIS26 Safeguarding thermoform, fill and seal machines
- FIS27 Safeguarding palletisers and depalletisers
- FIS29 Controlling exposure to disinfectants
- FIS30 Preventing falls from height
- FIS33 Roll cages and wheeled racks



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