

# Personal buoyancy equipment on inland and inshore waters

## HSE information sheet

### Agricultural Information Sheet No 1

#### Introduction

This information sheet aims to improve safety for activities on inland or inshore waters at establishments which are covered by the Health and Safety at Work etc Act 1974 (HSW Act) and where the Health and Safety Executive (HSE) is the enforcing authority. These include fish farms, floating cage units, mussel rafts, farm or estate fisheries and similar activities.

The objective of this sheet is to reduce the number of accidental drownings to employees, employers, the self-employed and members of the public (including children).

#### Background

Accidental drowning can usually be linked to one or more of the following factors:

- failure to provide personal buoyancy equipment;
- failure of buoyancy equipment to operate correctly;
- disregard or misjudgement of a hazard;
- lack of supervision, especially of the young;
- inability to cope once a problem arises;
- the absence of rescuers and rescue equipment;
- failure to take account of weather forecasts.

Falling unexpectedly, fully clothed into cold water, and trying to swim or co-operate with rescuers, is often extremely difficult. Even strong swimmers may experience problems.

#### The need

Where there is a risk of falling into the water and drowning, it is essential to provide sufficient buoyancy to keep the person safely afloat.

#### Requirements

On inland and inshore waters employers and the self-employed need to meet their obligations under the HSW Act. They also have to carry out a risk

assessment in accordance with the Management of Health and Safety at Work Regulations 1999 to identify any foreseeable hazard, assess the level of risk and identify measures necessary to prevent or adequately control the risk. Where there is a foreseeable risk of drowning, not controlled by other means, suitable personal buoyancy equipment needs to be provided for and worn by employees. The Personal Protective Equipment at Work Regulations 1992 detail responsibilities about selecting, using and maintaining personal buoyancy equipment.

Employers and the self-employed have similar requirements for their own safety and will be expected to provide and wear suitable buoyancy equipment. Hirers of boats will need to consider provision of suitable buoyancy equipment for use by members of the public.

#### Selecting personal buoyancy equipment

When selecting the correct personal buoyancy equipment, you will need to consider a number of factors such as frequency of use, size/weight of the wearer, ability to swim, protective clothing in case of foul weather, use of tool belts or other loads, likely weather/water conditions at site and availability of help.

Combined British and European Standards (BS ENs) exist for buoyancy equipment. Each Standard is intended to be suitable for different activities in various risk situations. Buoyancy equipment needs to be selected from the appropriate Standard, taking into account the factors already mentioned.

The Standards include:

- BS EN 393:1994 *Lifejackets and personal buoyancy aids: Buoyancy aids: 50 N*. These have a buoyancy of no less than 50 Newtons for the average adult and are intended for use in sheltered waters when help is close at hand and the user is a swimmer; and in circumstances where more bulky or buoyant devices would impair the user's activity or actually endanger them.

- BS EN 395:1994 *Lifejackets and personal buoyancy aids: Lifejackets: 100 N*. These have a buoyancy of no less than 100 Newtons for the average adult and are intended for relatively sheltered waters when normal clothing is being worn and the wearers remain capable of helping themselves.
- BS EN 396:1994 *Lifejackets and personal buoyancy aids: Lifejackets: 150 N*. These have a buoyancy of no less than 150 Newtons for the average adult and are intended for use in tidal waters or when foul weather clothing is being used; and where the wearers may not be capable of helping themselves due to injury or exhaustion (or where there may be a delay in rescue).
- BS EN 399:1994 *Lifejackets and personal buoyancy aids: Lifejackets: 275 N*. These have a buoyancy of no less than 275 Newtons for the average adult and are intended for use in tidal waters in extreme conditions, when heavy protective clothing is being worn or loads such as tool belts are being carried; and where the wearers may not be capable of helping themselves due to injury or exhaustion (or where there may be a delay in rescue).
- BS EN 394:1994 *Lifejackets and personal buoyancy aids: Additional items*. This standard deals with the emergency lights, safety harnesses, protective covers etc. When deciding on the design of buoyancy equipment to be used, you need to consider whether to provide extra items.

The final decision on the design and level of buoyancy needed depends on the results of a suitable risk assessment and should only be made after discussion with the supplier/manufacturer on the intended use.  
**Note:** Where the Maritime and Coastguard Agency (MCA) is the enforcing authority for an operation, all relevant life saving appliances (including lifejackets) should meet their standards.

### Using and maintaining personal buoyancy equipment

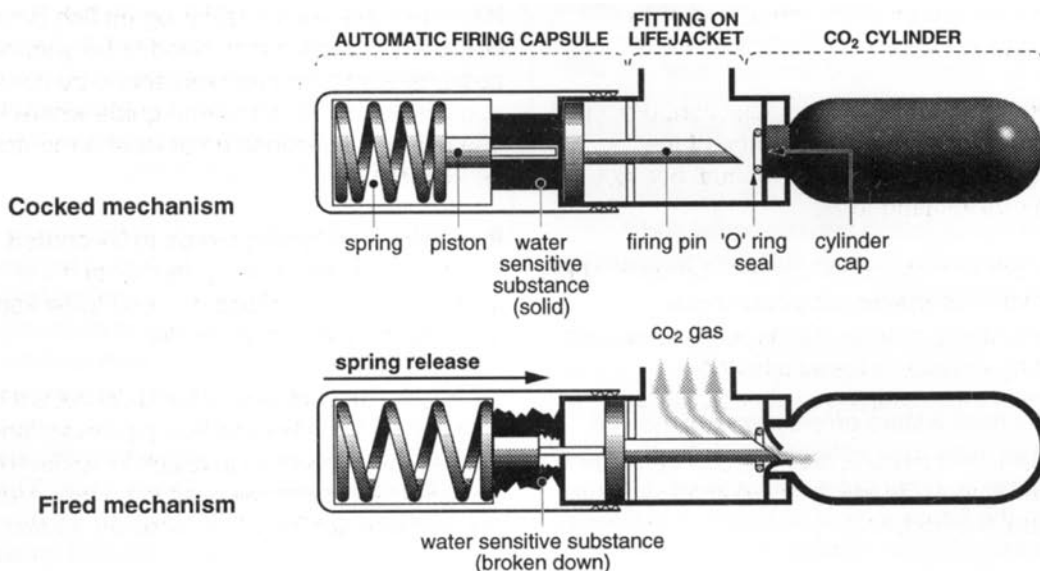
There is a risk of any design of personal buoyancy equipment failing to operate correctly, or at all, if it is not properly used and maintained. To minimise this risk, you need a policy to ensure proper use, inspection, maintenance and storage of the equipment. The maintenance needs of the equipment are largely dictated by the method of achieving buoyancy and the environment to which it is exposed.

Buoyancy can be provided in a variety of ways, ranging from permanently buoyant material to inflatable chambers or combinations of both.

Automatically inflated lifejackets are suitable for those likely to fall into the water unexpectedly. Manually inflated lifejackets should only be used if it is certain that the wearer will have enough time to produce full buoyancy before entering the water.

It is vital that the lifejacket/buoyancy aid is the correct type for the water conditions where the work is to be carried out. Even if a lifejacket/buoyancy aid complies with a BS EN Standard, it does not mean that it is suitable for use in all water or work conditions.

The lowest requirements are on equipment relying totally on permanently buoyant material. This will normally need only regular visual checks to ensure the integrity of the outer cover, buoyancy material and fastenings. The greatest requirements are on equipment which relies entirely on manual or automatic gas inflation as damage to the inflation chamber(s), inflation mechanism or gas cylinder could result in total failure to provide buoyancy.



Automatic inflation mechanism

The following provides advice on the use and maintenance of lifejackets which inflate automatically.

## **Operating automatic inflation mechanisms**

There are a number of different automatic inflation mechanisms in use. However, they work on similar principles (see diagram). The automatic inflation mechanism consists of an automatic firing capsule, a carbon dioxide gas cylinder and a fitting attached to the lifejacket that holds these two parts in place.

A substance that breaks down on contact with water, eg 'salt' or 'paper ring' is used within the automatic firing capsule to hold back a spring loaded piston which acts on a sharp pin. If the mechanism comes into contact with the water, the 'salt' or 'paper ring' breaks down and releases the spring. The piston is forced forward by the spring and the sharp pin pierces the cap of the gas cylinder and the lifejacket is inflated.

## **Management**

A clear policy needs to be in place on the use, inspection, maintenance and storage of automatically inflated lifejackets. This policy also needs to address the training needs of lifejacket users.

If lifejackets are used regularly, they should be issued to an individual user. The individual, having been adequately trained, can then be responsible for carrying out pre-wear checks, inspections and report defects according to company procedures. This will help ensure correct inflation of the lifejackets is not jeopardised by the carelessness of others.

Management needs to enforce its policy on lifejackets. This can be achieved by spot checks of both the condition of the lifejackets in use and the records of inspection and servicing.

## **Training**

All workers who use automatically inflated lifejackets need to be trained and competent in their care and use including pre-wear checks and inspection procedures. Training should cover:

- an explanation of the risks present and the need for lifejackets;
- operation, performance and limitations of the equipment provided;
- instruction and practice on the selection, pre-wear checks, inspection, use and storage of the

lifejackets including use of the manual override lever and oral inflation tube;

- factors which can affect the correct operation of the lifejacket such as the working conditions, inadequate fitting, defects, damage and wear etc (recognising defects in lifejackets and arrangements for reporting loss or damage);
- extra or refresher training may need to be given, eg if a new type of lifejacket or automatic inflation mechanism is introduced.

## **Pre-wear checks**

A pre-wear check needs to be carried out each day the lifejacket is used. This should be carried out in accordance with manufacturers' instructions and will normally include visual checks to ensure:

- the firing mechanism has not been activated;
- the automatic firing capsule and gas cylinder are correctly screwed in place;
- there are no signs of corrosion, cracks or dents in the gas cylinder or automatic firing capsule;
- unwanted movement within the firing mechanism ('creepage') has not occurred. Some automatic inflation mechanisms have indicators to show when compression in the spring has been lost. Those that do not have such indicators will require careful inspection to judge whether the spring has lost any compression. Examination of the piston or other visible component may also show whether creepage has happened;
- the whistle (and light where fitted) is in position;
- the oral inflation tube is capped;
- the straps and main body of the jacket are not worn or damaged;
- the jacket is correctly packed in accordance with the manufacturer's instructions (ensuring that any Velcro is correctly fastened and the manual inflation lanyard is accessible).

## **Inspection and maintenance**

As well as pre-wear checks, a more thorough inspection and testing programme needs to be carried out in accordance with manufacturers' instructions. Where lifejackets are used heavily, eg on fish farms, the periods between inspection may need to be shorter than the quarterly inspection recommended by some manufacturers. As a general guide where lifejackets are used daily, inspections on at least a monthly basis may be necessary.

Inspection and testing needs to be carried out by those competent in recognising defects and the remedial action to be taken. Records need to be kept of all inspections and repairs made.

Testing the air tightness of the lifejacket will involve orally inflating the lifejacket and leaving it overnight (or submerging it in water) to check for leaks. The automatic inflation mechanism will need to be dismantled to make a detailed examination of its condition. Make sure:

- all screw threads are examined for signs of rust. Rust can lead to problems in locating the cocking cap or the gas cylinder in the correct position;
- the gas cylinder is full (gross minimum weight);
- the gas cylinder is examined for corrosion, cracks, dents and other defects. Particular attention will need to be paid to the cylinder cap as any indentations found could mean that the automatic firing mechanism has fired but failed to pierce the cylinder. If this is the case, the reason for activation and the cause of failure needs to be identified;
- the cylinder fitting and groove of the firing pin are checked so that they are free from dirt;
- the automatic inflation mechanism is operated manually (with the gas cylinder removed) to ensure that it operates smoothly, and that there is no obstruction to the movement of the pin which prevents it from piercing the cylinder. The pin also needs to be checked to ensure that it is sharp;
- the 'salt' or 'paper ring' are inspected for any cracking, dissolving or tearing which has taken place since the last inspection;
- where fitted, the rubber 'O' ring is inspected for damage and that it is correctly seated;
- the mechanism is checked for signs of 'creepage'.

Once the inspection is complete the lifejacket should be reassembled according to the manufacturer's instructions.

Manufacturers generally recommend lifejackets to be serviced every two years by people they appoint. However, where lifejackets are used very regularly, an annual or more frequent service may be needed.

If any defects are found with either the gas cylinder or the automatic inflation mechanism, these parts must be replaced. If the lifejacket is in need of repair, return it to the manufacturer. Repairs should only be carried out by people approved by the manufacturer.

## Storage

Exposure to damp, humid conditions could lead to deterioration in the automatic inflation mechanism known as 'creepage'. This has the potential to lead to failure of the pin to pierce the carbon dioxide gas cylinder.

Lifejackets need to be stored in suitable dry conditions. The following advice should be followed when storing lifejackets:

- Do not hang lifejackets up with wet oil skins or other damp clothing.
- If the lifejacket is wet, unpack it and leave it to dry out on a hanger.
- Do not store lifejackets close to or directly above heat sources, eg convection heaters.
- Do not store lifejackets upside down. This is to prevent water getting in to the automatic inflation mechanism.
- Make sure there is enough space around the lifejacket, when it is stored, to allow the air to circulate.

## Further reading

*Management of health and safety at work. Management of Health and Safety at Work Regulations 1999. Approved Code of Practice L21 (Second edition) HSE Books 2000*  
ISBN 978 0 7176 2488 1

*Personal protective equipment at work (Second edition). Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations L25 (Second edition) HSE Books 2005*  
ISBN 978 0 7176 6139 8

*Health and safety on floating fish farm installations INDS28(rev) HSE Books 1997*

## Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit [www.hse.gov.uk/](http://www.hse.gov.uk/). You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

British Standards can be obtained in PDF or hard copy formats from BSI: <http://shop.bsigroup.com> or by contacting BSI Customer Services for hard copies only  
Tel: 020 8996 9001 email: [cservices@bsigroup.com](mailto:cservices@bsigroup.com).

**This information sheet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.**

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