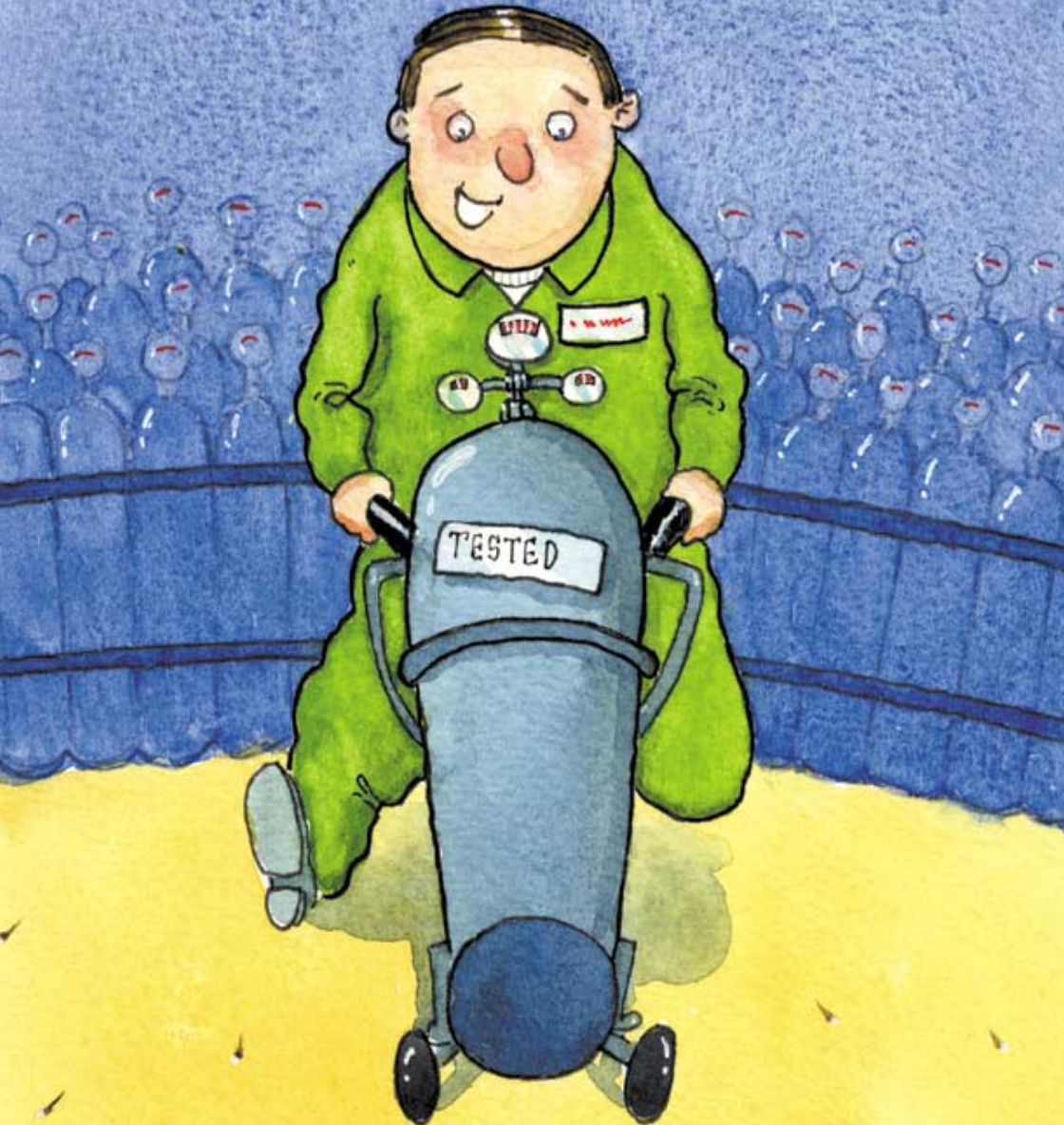
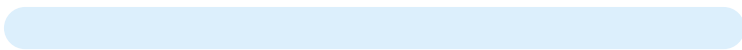




The safe use of gas cylinders





INTRODUCTION

Accidents involving gas cylinders can cause serious injury or even death. This leaflet provides simple practical advice on eliminating or reducing the risks associated with using gas cylinders.

The leaflet is aimed at anyone who manufactures, owns, fills, repairs or uses gas cylinders at work. **The legal term for gas cylinders is transportable pressure receptacles or transportable pressure vessels.** The advice will be useful for those who own or manage small businesses.

Gas cylinders used in adverse or extreme conditions, such as under water, may require special precautions. Although the advice in this leaflet is valid for all uses of gas cylinders, these extra precautions are not covered.

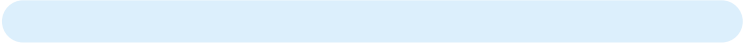
As an employer or self-employed person, you have a duty to provide a safe workplace and safe work equipment. Designers, inspectors, manufacturers, suppliers, users and owners also have duties.

Employers have a further duty to consult any safety or employee representatives on health and safety matters. Where none are appointed, employers should consult the workforce directly.

Uses of gas cylinders

Gas cylinders are a convenient way to transport and store gases under pressure. These gases are used for many different purposes including:

- chemical processes;
- soldering, welding and flame cutting;

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- breathing (eg diving, emergency rescue);
 - medical and laboratory uses;
 - dispensing beverages;
 - fuel for vehicles (eg fork-lift trucks);
 - extinguishing fires;
 - heating and cooking;
 - water treatment.

The main hazards are:

- impact from the blast of a gas cylinder explosion or rapid release of compressed gas;
- impact from parts of gas cylinders that fail, or any flying debris;
- contact with the released gas or fluid (such as chlorine);
- fire resulting from the escape of flammable gases or fluids (such as liquefied petroleum gas);
- impact from falling cylinders;
- manual handling injuries.

The main causes of accidents are:

- inadequate training and supervision;
- poor installation;
- poor examination and maintenance;
- faulty equipment and / or design (eg badly fitted valves and regulators);
- poor handling;
- poor storage;
- inadequately ventilated working conditions;
- incorrect filling procedures;
- hidden damage.

HOW TO REDUCE THE RISKS

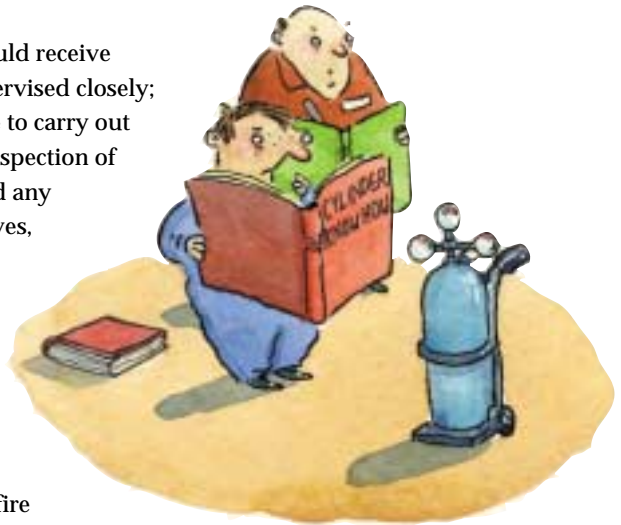
All gas cylinders must be designed and manufactured to an approved specification to withstand everyday use and to prevent danger (see Legislation, page 10). They must be periodically examined at appropriate intervals to ensure that they remain safe in service. To reduce the risks of failure you need to know, and act on, the following precautions.

Training

Anyone who examines, refurbishes, fills or uses a gas cylinder should be suitably trained and have the necessary skills to carry out their job safely. They should understand the risks associated with the gas cylinder and its contents.

In particular:

- new employees should receive training and be supervised closely;
- users should be able to carry out an external visual inspection of the gas cylinder, and any attachments (eg valves, flashback arresters, and regulators), to determine whether they are damaged. Visible indicators may include dents, bulges, evidence of fire damage (scorch marks) and severe grinding marks, etc.



Handling and use

- Use gas cylinders in a vertical position, unless specifically designed to be used otherwise.
- Securely restrain cylinders to prevent them falling over.
- Always **double check** that the cylinder/gas is the right one for the intended use.
- Before connecting a gas cylinder to equipment or pipework make sure that the regulator and pipework are suitable for the type of gas and pressure being used.
- When required, wear suitable safety shoes and other personal protective equipment when handling gas cylinders.
- **Do not** use gas cylinders for any other purpose than the transport and storage of gas.
- **Do not** drop, roll or drag gas cylinders.
- Close the cylinder valve and replace dust caps, where provided, when a gas cylinder is not in use.
- Where appropriate, fit cylinders with residual pressure valves (non-return valves) to reduce the risk of back flow of water or other materials into the cylinder during use that might corrode it (eg beer forced into an empty gas cylinder during cylinder change-over).



Lifting

- Use suitable cradles, slings, clamps or other effective means when lifting cylinders with a hoist or crane.
- **Do not** use valves, shrouds and caps for lifting cylinders unless they have been designed and manufactured for this purpose.
- Gas cylinders **should not** be raised or lowered on the forks of lift trucks unless adequate precautions are taken to prevent them from falling.

Transport

- Fit suitable protective valve caps and covers to cylinders, when necessary, before transporting. **Caps and covers help prevent moisture and dirt from gathering in the valve of the cylinder, in addition to providing protection during transport.**
- Securely stow gas cylinders to prevent them from moving or falling. This is normally in the vertical position, unless instructions for transport state otherwise.
- Disconnect regulators and hoses from cylinders whenever practicable.
- **Do not** let gas cylinders project beyond the sides or end of vehicles (eg fork-lift trucks).
- Ensure gas cylinders are clearly marked to show their contents (including their UN number) and the danger signs associated with their contents.
- It may be necessary to take special measures with certain types and quantities of compressed gases and fluids in order to ensure



their safe carriage. If you have any doubts seek further guidance (see Further advice, page 15).

- The transport of gas cylinders is subject to carriage requirements. For example, that:
 - the vehicle is suitable for the purpose;
 - the vehicle is suitably marked to show that it is carrying dangerous goods;
 - the driver is suitably trained; and
 - the driver carries the appropriate documentation about the nature of the gases being carried.

Storage

- Store gas cylinders in a dry, safe place on a flat surface in the open air. If this is not reasonably practicable, store in an adequately ventilated building or part of a building specifically reserved for this purpose.
- Gas cylinders containing flammable gas should not be stored in part of a building used for other purposes.
- Protect gas cylinders from external heat sources that may adversely affect their mechanical integrity.
- Gas cylinders should be stored away from sources of ignition and other flammable materials.
- Avoid storing gas cylinders so that they stand or lie in water.
- Ensure the valve is kept shut on empty cylinders to prevent contaminants getting in.
- Store gas cylinders securely when they are not in use. They should be properly restrained, unless designed to be freestanding.
- Gas cylinders must be clearly marked to show what they contain and the hazards associated with their contents.
- Store cylinders where they are not vulnerable to hazards caused by impact, eg from vehicles such as fork-lift trucks.