



# Use and Storage of Compressed Gas Cylinders Code of Practice

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## 1.0 Compressed Gas Cylinders

Accidents involving gas cylinders can cause serious injury or even death. This Code of Practice provides simple practical advice to Faculties and Departments on eliminating or reducing the risks associated with using gas cylinders.

The legal term that covers gas cylinders is 'pressure receptacle'. This is a generic term covering many different types of pressure receptacle including pressure drums and cryogenic receptacles etc. However, for the purposes of this Code of Practice, the term 'gas cylinder' will mean all these various types of pressure vessel which may be kept in Faculties or Departments.

## 2.0 Uses of Gas Cylinders

2.1 Various gases are used throughout the University for different purposes:

- Chemical processes
- Soldering, welding and flame cutting.
- Laboratory use (for teaching and research purposes).
- Dispensing beverages.
- Extinguishing fires.
- Heating and cooking, (field trips)

2.2 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 or valves that fail, or any flying debris.
- Contact with the released gas or fluid.
- Fire resulting from the escape of flammable gas or fluid
- Impact from falling cylinders
- Manual handling injuries.

2.3 How to Reduce the Risks

All gas cylinders must be designed and manufactured to an approved standard to withstand everyday use and to prevent danger. They must be initially inspected before they are put into service to ensure they conform to the approved standard and be periodically examined at appropriate intervals to ensure that they remain safe while in service. To reduce the risks of failure you need to know, and act on, the following precautions.



## 3.0 Training

- 3.1 Anyone who examines, fills or uses a gas cylinder must be suitably trained and have the necessary skills to carry out their job safely and they should be aware of the risks associated with the gas cylinder and its contents.
- 3.2 In particular, all new employees required to work with compressed gas cylinders must receive adequate training and be closely supervised. The necessity for training will be identified during the risk assessment process.
- 3.3 Users should be able to carry out an external visual inspection of the gas cylinder, and any attachments (e.g. 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.
- 3.4 Valves should only be removed by trained personnel using procedures which ensure that either the cylinder does not contain any pressure or that the valve is captured during the removal process.
- 3.5 All personnel involved with the handling of compressed gas cylinders are to receive manual handling training. Details of Manual Handling Training can be found in the Staff Training & Development Programme.

## 4.0 Manufacture and Initial Examination

The law requires that gas cylinders are:

- manufactured to an appropriate standard approved under the relevant legislation and
- examined by "a relevant inspection body" to verify that the cylinders are manufactured correctly and conform to the appropriate design standard.

Owners and fillers should satisfy themselves that the manufacturing requirements have been carried out, by examining either:

- the written certificate which accompanies the gas cylinder; or
- the stamp or mark of the relevant inspection body on the gas cylinder itself.

## 5.0 Periodic examination

If you own or fill gas cylinders, to make sure that they are safe for continued use, you must ensure that they have been examined at the intervals as required by the Carriage Regulations.



The law requires that all gas cylinders and valves are:

- examined and tested by the appropriate inspection body, in accordance with relevant regulations and at specified intervals and
- permanently marked by an appropriate inspection body to show the date of the last periodic examination.

Standards for Periodic Inspection and Testing of cylinders and valves, and for Specification and Testing for closures, can be found on the HSE web site at: [www.hse.gov.uk/cdg/pressure.htm](http://www.hse.gov.uk/cdg/pressure.htm)

NOTE: Make sure that cylinders are empty and depressurized BEFORE removing the valve.

## **6.0 Repair**

For old Transportable Pressure Receptacles (TPRs) there are legal requirements which prohibit modifications (with the exception of neck thread cutting) or major repairs to the body of seamless gas cylinders or cylinders which have contained acetylene. However, legal requirements allow for the modification and major repair (i.e. hot work) of other types of cylinders, subject to certain conditions. These include that a relevant inspection body marks or certifies the cylinder as being fit for use.

For new TPRs repairs are prohibited to welds, cracks in the wall and leaks or other defects in the material of the wall, head or bottom of the cylinder. This allows the re-cutting of neck threads, but restricts hot work to de-denting operations only, and these must be carried out under the approval of a Notified or Approved Body.

## **7.0 Filling**

Anyone carrying out the filling of gas cylinders should wear appropriate personal protective equipment. This may include safety shoes, protective overalls, gloves and ear and eye protection.

Standards for Inspection of Time of Fill should be followed. A current list of these standards, including standards for Pressure Drums, can be found on the HSE web site at: [www.hse.gov.uk/cdg/pressure.htm](http://www.hse.gov.uk/cdg/pressure.htm)



## 8.0 Identification of Gases

- 8.1 In 2005 a new standard (BS EN 1089-3) governing the colour coding of gas cylinders came into force across Europe. As a result, some cylinders received from your supplier will have a new colour scheme. However, the change over period for the new scheme is five years and to avoid confusion during this change over period the cylinder label is the key descriptor in every instance. Extra care must be taken during the change over period.
- 8.2 The New Colour Scheme - Certain gases under the new standard have a specific colour for the shoulder of the gas bottle:
- Argon - Dark green
  - Carbon Dioxide - Grey
  - Helium - Brown
  - Nitrogen - Black
  - Nitrous Oxide - Blue
  - Oxygen - White
  - Acetylene - Oxide Red - however it is UK law for acetylene cylinders to be painted Maroon.

Other gases will have the hazard property displayed on the shoulder of the gas bottle:

- Flammable - Red
- Toxic/Corrosive - Yellow
- Inert - Bright Green
- Oxidising - Pale Blue

Note: more than one hazard property may be shown on the cylinder shoulder e.g. red and yellow.

## 9.0 Storage of Compressed Gas Cylinders

- 9.1 Heads of Department or their delegated representative are to observe the following criteria for storing compressed gases:
- When not in use or empty the cylinders must be stored in the external storage compound.
  - Only the smallest size cylinder should be purchased, based on frequency of use and volume used.
  - Gas cylinders should not be stored for excessive periods of time. A record of the 'use by' date is to be maintained within the department.
  - Rotate stocks of gas cylinders to ensure 'first in' is 'first used'.



- Compressed gas cylinders are to be securely restrained to ensure they cannot fall from their vertical storage position. They should be secured using straps or chains or by use of a cylinder stand.
- Always double check the gas being used is the correct one for the intended use.
- Gas cylinders containing flammable gas are not to be stored in part of a building used for any other purpose.
- Protect gas cylinders from external heat sources that may adversely affect their mechanical integrity.
- Gas cylinders are to be stored away from sources of ignition and other flammable materials.
- LPG cylinders must not be stored within 3m of any compressed gas cylinders (including acetylene). The separation requirement can be relaxed when the quantity of LPG stored is less than 50kg. (Seek advice from the University Health and Safety Team).
- Toxic and corrosive gases are to be stored separated from all other gases by at least 1m.
- Cylinders should be transported using cylinder trolleys designed for that purpose and must be secured so that they do not tip, fall or roll.
- Wear suitable safety shoes and other personal protective equipment as identified by risk assessment when handling gas cylinders.

## 10.0 Signage

10.1 All gas cylinders must be clearly marked to show what they contain and the hazards associated with their contents. The departments or Faculties who have responsibility for Compressed Gas Cylinders are responsible for their own signage.

10.2 All gas storage areas are to clearly marked to identify the hazards associated with the storage facility. The hazards associated with gases include:

- Flammable
- Toxic/Corrosive
- Inert
- Oxidising

## 11.0 Compressed Gas Monitoring

11.1 The Assistant Director of Health, Safety and Sustainability will monitor compressed gas installations and storage facilities to ensure all safety



precautions are being observed and compressed gas cylinder records maintained. Monitoring should also be included as a function of the Faculty or departments local Health and Safety Monitoring Programme.

- 11.2 The Assistant Director of Health and Safety must be informed of any additional compressed gas or LPG bottles being located on University premises.
- 11.3 The Assistant Director of Health and Safety will include the location of compressed gas and LPG storage facilities on all University fire plans.

## **12.0 Legislation**

12.1 The two principal sets of regulations covering gas cylinders are:

- The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended). (the "Carriage Regulations").
- The Pressure Equipment Regulations 2016.

12.2 The British Compressed Gas Association (B.C.G.A.) also produces guidance on the use and storage of compressed gas and compressed gas cylinders  
<http://www.bcgga.co.uk/>.