



3.19

Chemical Safety Management

Information Sheet : Gas Cylinders and Compressed Gases

Purpose

The purpose of this information sheet is to guide workers and supervisors in general precautions and emergency responses for gas cylinders and compressed gases.

Q1 What are the general hazards of compressed gases?

- The pressure contained in the cylinder: the higher the pressure, the more potential for damage.
- The expansion of the gas when released: expanding gases can propel other objects and create further hazards.
- Contents, depending on their nature, can present their own hazards:
 - Flammable/explosive
 - Oxidant
 - Corrosive
 - Toxic
- The density, dense gases can pool in low-lying areas, entrapping a hazardous gas and/or presenting an asphyxiation risk.
- Weight and handling risks of the cylinder.

Q2 How do I identify the gas cylinder?

The easiest way of identifying the type of gas cylinder is to:

- read the gas identification label prior to use.
- then read the gas safety data sheet prior to using for the first time.

Never use a gas cylinder that does not have an identification label - return to the supplier immediately if the identification label is missing.

Q3 What are gas regulators and the general rules for using them?

- Regulators reduce the high pressure in a gas cylinder to a more usable lower pressure and are used in most but not all applications, depending on the type of gas and its use. Regulators are specific to a gas or gases.
- As with other items of plant, regulators are to be maintained in a safe condition. Servicing intervals are specified by the manufacturer. (Note it may be more cost effective to just replace regulators rather than servicing them).
- Use the correct regulator for the gas and never use adaptors.
- Never grease or oil the regulator, valve, or fittings of an oxygen cylinder (as it could result in a fire/explosion).
- Use leak detection fluid after attaching regulators/fittings:
 - Soapy water will suffice in many cases.
 - Proprietary aerosol cans are also available (recommended for oxygen cylinders).

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Q4 What are the general rules for handling and using gas cylinders?

The following should be considered when working with gas cylinders:

- When using, or generating gases, care must be taken that the discharges from fume cupboards or fume extraction systems do not exceed the occupational exposure levels for that substance (refer to safety data sheet), or that the volume does not exceed the exhaust capacity of the fume cupboard.
- All precautions are to be taken to prevent damage to the cylinder valve - if it detaches the cylinder may become a projectile.
- Personal Protective Equipment suitable for the type of gas and task must be worn.
- Cylinders are heavy and awkward to manoeuvre - adopt correct manual handling techniques (e.g. always use a cylinder trolley).
- The contents of a cylinder must be checked before use - ensure that the gas is the correct one for the job.
- Cylinder valves must be closed when not in use.
- Where cylinders are fitted with valve protection the valve should be in place and properly secured.
- Full cylinders should be arranged so that the oldest stock is used first.
- Return all cylinders that are not currently required (note there is a monthly rental charge on cylinders).
- All cylinders (including empties) must be restrained.

Don'ts

- Never force improper attachments on to the wrong cylinder.
- Do not attempt to repair a cylinder, valve or regulator.
- Never use a flame to locate gas leaks.
- Do not heat or apply naked flame to a cylinder.
- Do not attempt to refill a cylinder.

Q5 What general rules should be used when storing gas cylinders?

Storage

Gas cylinders have specific storage requirements.

In general:

- Gas cylinders must be prevented from falling over using a suitable restraint (see examples below).
- Oxygen (or other gas) monitoring may need to be installed depending on the size of the room, the gas and the room ventilation. Contact the [HSW Team](#) if advice is required.
- Whilst a toxic gas is in use, the entrance of the laboratory must be clearly signposted.
- A dedicated gas cylinder storage area shall not be used to store any other materials or used for any other activities.
- Do not store cylinders in exits or egress routes.
- Full and empty cylinders should preferably be stored separately.
- Cylinders stored in the open should be protected against rust and extremes of weather.
- Cylinders in storage should be checked periodically for general condition and leakage.
- Flammable gases and Flammable aerosols (DG 2.1), Acute toxic gases (DG 2.3) and Oxidising gases (DG 2.2); should be segregated where possible; a minimum physical separation of 3 metres between these divisions is recommended by [Australian Standard 4332-2004 The storage and handling of gases in cylinders](#).
- Ensure that the maximum permissible amount in buildings is not exceeded (see Table 1 below).

Maximum permissible amounts in buildings

In terms of storage, the total dangerous goods load will be the combination of all cylinders whether **empty, full, or in use** (a cylinder is defined as **in use** if it is connected to a system, including standby cylinders).

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Q5 What general rules should be used when storing gas cylinders?(Continued)

Table 1: Maximum aggregate water capacity of gas cylinders per 200 m² of floor space.

MAXIMUM QUANTITIES OF GASES PERMISSIBLE FOR CLASSIFICATION AS MINOR STORAGE	
Class of gas (GHS)	Maximum aggregate water capacity, L
2.1 (Flammable)	500
2.2 (Aerosols)	2000
2.2, with Class 5.1 Subsidiary Risk (Aerosols and Oxidiser)	1000
2.3 (Corrosive/Acute toxic)	50

The number of gas cylinders permitted indoors (minor storage) is based on the maximum aggregate water capacity of any cylinders, including empty ones and those in use. This quantity is dependent on the type of gas.
 Note that one G sized cylinder contains 48L.

Restraints

- Cylinders must be appropriately restrained to prevent them from falling over. These restraints usually consist of either chains with hooks, or straps with a clip (see below).
- It should be noted that an appropriately constructed gas cylinder trolley can be used as a form of temporary restraint, for short term experiments.



Q6 How do I transport gas cylinders?

- Gas cylinders must not be transported inside enclosed vehicles (including the boot section).
- Gas cylinders should be transported upright where possible.
- LPG cylinders (and any others with liquefied gas) must be transported with the relief valve uppermost, e.g. the cylinder's orientation must be the same as when normally being used. In the case of forklift gas cylinders, this orientation is normally horizontal.
- Vehicles transporting ANY amount of Flammable gases and Flammable aerosols (DG 2.1) or Acute toxic gases (DG 2.3) dangerous goods must be placarded appropriately. Those transporting a total of 250 litres or kg or more of dangerous goods must also be placarded.
- Gas cylinders should be manually transported using a trolley designed for this task.
- Cylinders can be moved short distances (from trolley to restraint and visa versa) by churning (defined as rolling cylinders in the upright position on the bottom edge). Any fixtures such as a regulator should be removed prior to this. Never roll or drag a cylinder to move it. Never carry a cylinder by the valve.

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Q7 How do I dispose of gas cylinders?

- Never discard pressurised cylinders in the normal waste.
- Cylinders must be disposed of via the supplier, however if you locate a cylinder to which the supplier is no longer in business, please contact the [HSW team](#) for correct disposal methods.

Further information

If you require further information, please contact a member of the [HSW Team](#).

Authorisation

Associate Director, HR Policy, Safety and Compliance

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