

University Health and Safety Standard

Gas Cylinder Storage

A gas cylinder is “in storage” when:

- It is not in use (i.e., it is not connected to user equipment); or
- It is connected (through the gas supply pipework) and in use as the gas source for a gas supply and distribution system. (Refer to BCGA CP4 - Gas supply and distribution systems). A spare cylinder, which is on standby for this system, is also “in storage.”
- It is a mobile gas supply system (e.g., an oxy-fuel gas welding set mounted on a trolley), whilst not in use.

Gas cylinders must always be stored in suitable gas storage facilities. Gases not in use must not be stored in labs/ workshops. This applies to both full gas cylinders and “empty” gas cylinders.

The number of gas cylinders stored must be managed by the Faculty/ PSU/ Student Union. They should be kept to a minimum and must not exceed the capacity of the stores.

1.0 Location, Design, and Construction of Gas Stores

Gas cylinder storage areas must be designed to accommodate the various gases required by the user (considering the hazard classification and properties of the gases). Gases must be stored according to their hazard class.

When deciding on the location, design and subsequent construction of a new gas cylinder store a site-specific risk assessment must be carried out; Refer to BCGA CoP 44, The storage of gas cylinders. The risk assessment is normally completed prior to construction, in the design phase. Recognised industrial standards should be followed: <https://bcga.co.uk/publications/>, and specialist advice is recommended. Outdoor storage in well-secured compounds or cages and piped into the building, where needed, is recommended.

Gas cylinder stores should:

- Be well ventilated.
- Be outdoors*; If a store is in any location other than outdoors, additional controls are required.
- Have adequate security.
- Meet the required separation distances. Refer to BCGA GN 41 Separation distances in the gases industry.
- Have adequate signage to provide safety information and warnings on the hazardous products being stored (Appendix A).

*A store is only considered to be outdoors if the following conditions are met:

- A minimum of 30% of the perimeter is open (naturally ventilated), with no roof installed.
- A minimum of 50% of the perimeter is open (naturally ventilated), with a roof installed.

Where it has been identified in the risk assessment that a gas store requires refurbishment/ improvements the faculty is responsible for ensuring the recommended controls are implemented. All existing gas stores should comply with the current standards. Recognised industrial standards should be followed: <https://bcga.co.uk/publications/>.

The location of all cylinder stores must be recorded within the site's Risks and Hazards Register on the university CAFM system. This record should include information on the products that can be stored, hazard classifications and the maximum number of each cylinder type to be held within the store. This should be updated on a regular basis and be available to the emergency services when required.

1.1 Handover

During the handover of a new or refurbished gas store responsibility transfers from the Projects Team to the University's user department and Maintenance Team; the handover process, for new and refurbished gas stores, should include:

- A copy of the risk assessment and the Operational and Maintenance Manual (O&M). This must be uploaded to the hazard module in Quemis and made available to the faculty for ongoing review.
- Where relevant, statutory examinations and testing must be carried out, training must be provided and responsibility for the ongoing maintenance of the store must be agreed prior to handover.
- The location of all cylinder stores must be recorded within the site's hazard register, as detailed above.

Following the handover, the Faculty/ PSU is responsible for the management of the store and the on-going review of risk assessments. These reviews shall ensure existing and emerging risks are managed, for example, due to inventory changes, changes to the site of surroundings, shortfalls in management control, adverse events, updates to codes and best practice documents etc.

2.0 The Management of Cylinder Stores

As per the policy, a named individual (the Local Contact) must be assigned responsibility for the day-to-day management of each cylinder store within the Faculty/ PSU/ Student Union facility; their name and contact details must be displayed at the entrance to the store. This individual must be trained as a gas user (see HSA-10122-01 Gas Cylinder Safety Training).

2.1 Security of Gas Cylinder Stores

- All gas cylinder storage areas must be kept locked.
- Access keys, cards or codes must be kept secure.
- Access to the stores is restricted to Gas Users and a log of all gas cylinder movement is maintained. The log should include:
 - Date
 - Name of gas user

- Name of gas
 - “from” location
 - “to” location
 - Cylinder - Full/ Empty/ Quarantine.
- Access to the stores is only permitted during agreed core working hours, this will be determined, for each store, by the Head of Technical Infrastructure and Environment.
 - Access to the storage area is kept clear. No parking is allowed outside the entrance, except for the loading and unloading of gas cylinders.
 - The University Security and Campus Response Team must be able to provide access to the stores for the Emergency Services.

2.2 Stock Management

Faculties should consider the following, to track and monitor gas cylinder movement internally (there are software packages available to assist with this):

- Optimise cylinder stock holdings.
- Display all cylinder movements.
- Search for specific gas types or cylinder sizes.
- Reduce “emergency” deliveries.
- Reveal slow-moving cylinders.
- Set target stocks for individual locations.
- Supply accurate usage reports by gas type and Department.
- Provide an up-to-date inventory of gas cylinders (location and quantity).
- See Gas deliveries/ collections by gas supplier’s standard.

3.0 Safe Storage of Gas Cylinders by Gas Users

- University staff and students who require access to gas cylinders stores must be trained as gas users.
- Users must report any safety concerns relating to the gas store to the **Local Contact**, identified by the sign at the entrance to the store.
- Mobile phones and portable electrical equipment must not be taken into area containing flammable gases unless EX or ATEX rated.
- Suitable PPE must be worn within the store; the minimum requirements will be displayed at the entrance to the store. Where additional PPE is required, this will be identified in the relevant risk assessment.
- Cylinders that are not in use and empty cylinders must be returned to the gas store as soon as possible.
- The standards required for storing and handling “empty” gas cylinders are the same as for cylinders containing gas.
- All gas cylinders must be clearly labelled to show what they contain, and the hazards associated with their contents. Empty cylinders should be marked as “empty.”

- All gas cylinders must be moved and stored with their valves closed; valves are closed on empty cylinders to prevent moisture and other contaminants entering the cylinder and to enable them to be moved and transported safely.
- The sealing plug or cap-nut, provided on toxic/ corrosive gases, must be fitted when moving and storing (on full and empty cylinders).
- Gases with the same hazard category are stored together. The location should be clearly labelled inside the store; this should include separate storage locations for full (including part-full) and empty cylinders.
- Flammable, toxic, and oxidising cylinders must be separated from each other by a distance of at least 3 meters (or separated using a fire wall). Inert gases may be stored within these separation distances.
- Access to gas cylinder storage of toxic, corrosive, pyrophoric and medical gases must be restricted.
- Cylinders must be individually secured to prevent them from falling unless the cylinder is specifically designed to be free standing.
- Round bottomed cylinders should not rest directly on the floor and should be secured in a rack or stand to prevent them from moving.
- Most cylinders should be controlled using a First-In-First-Out basis to rotate stock.
- Some gases have a “return by” date (e.g., corrosive, and medical gases). These should be controlled using a First-Expired-First-Out. Expired cylinders must not be used. Contact the local contact if date is nearly due or has expired (this affects the supplier’s ability to transport them safely on public roads).
- Only gas cylinders and cylinders trolleys should be stored within the store. The gas store must not be used for the storage of any other items (e.g., oils, greases, paints, and fuels/ combustible materials).
- Gas cylinders that are unlabelled, damaged, or contaminated must not be used. These cylinders must be clearly labelled “quarantine,” they must be taken to the gas store, and the local contact must be informed.
- For gas cylinders that have been exposed to heat/ fire, follow the emergency procedure.

4.0 Annual Audit

An annual audit of each gas cylinder stores is to be carried out. This must include a physical audit of high hazard special gases (e.g. very toxic/ pyrophoric gases – whether full, in use or nominally empty). See Audit document for more information.

5.0 Reference

Available to download from <https://bcga.co.uk/publications/>

- BCGA CP4 – Gas supply and distribution systems (excluding acetylene).
- BCGA CP44 - The storage of gas cylinders.
- BCGA CP18 - The safe storage, handling, and use of special gases. (Toxic, corrosive, flammable and pyrophoric gases).
- BCGA CP52 - The management of risks from gases in the workplace.

- BCGA GN11 - The management of risk when using gases in enclosed workspaces). Liquid Gas UK CP7 – Storage of Full and Empty LPG Cylinders and Cartridges.
- BCGA CP40 - Security requirements for the industrial, medical and food gases industry.
- BCGA TIS48 – Gas Equipment – Security Cages.

Medical gases – medical gas store

- The National Health Service Protect document, Guidance on the security and storage of medical gas cylinders.
- HTM 02-01, Part B, Section 8, Medical gas pipeline systems.
- BCGA GN 32, Medical gases. Good distribution practice.

6.0 Appendix A

Gas cylinder Storage Signage

This document can be used to identify the signs required for your gas store and communicate your requirements with companies that makes safety signs. Safety signs should be sufficiently large and clear to be easily seen and understood. Signboards should also be durable, securely fastened and properly maintained (e.g., washed to ensure they remain visible).

1. You will require a “Contact information sign” for outside the gas cylinder store.
2. A safety sign for outside the gas cylinder store.
3. Signs for inside the gas cylinder store.

Sign selection will be determined by the gases to be stored. Compressed gas cylinder labels clearly identify the hazards (both Dangerous Goods symbols and GHS symbols). This information is also available on the Safety Data Sheet (SDS), provided by the gas supplier.

The SDS for BOC gases is available here: <https://www.boconline.co.uk/en/health-and-safety/safety-data-sheets/index.html>

Section 14 – transport classification (Dangerous Goods)

- Division 2.1: Flammable gases
- Division 2.2: Non-flammable, non-toxic gases
- Division 2.3: Toxic gases
- Division 5 – Oxidizing substances and organic peroxides
- Division 8 – Corrosive substances

Section 2 – Hazard identification (GHS symbols).

If further clarification is required, please contact the Health and Safety Lead or the Scientific Safety Officer.

1.0 Contact Information Sign

Gas Cylinder Store		
Local Contact Name and Tel. Number:		
Location of store:		
Location of access keys:		
Opening hours:		
Gas suppliers:	BOC	
	[Other]	
Emergency Contact Numbers:	University	333 (landline)/ 01792 513333 (mobile)/ SafeZone
	Emergency Services	999
	BOC emergency number	0800 111 333
	[Other] emergency number	[] delete if appropriate







2.0 Safety Sign for Outside the Gas Cylinder Store


The centre of the sign should be positioned at average eye level (between 1.5m – 1.7m above the ground). Signs should be visible from all angles of approach. Include the safety sign and description. Where additional safety signs are required, see **BS EN 7010-2012**.













Safety sign and description are available below, with guidance on when they should be used. Cut and paste into this table:

The boxes shaded grey boxes are for information only and must not be printed on signs.

			
Wear protective gloves	Wear safety footwear	Wear eye protection	Use self-contained breathing appliance
Mandatory	Mandatory	Mandatory	Required: Yes / No
Guidance: All stores	Guidance: All stores	Guidance: All stores	Guidance: Based on risk assessment
			
Use gas detector			
Required: Yes / No			
Guidance: Based on risk assessment			
			
No unauthorised access	No Smoking	No source of ignition	No activated mobile phone
Mandatory	Mandatory	Required: Yes / No	Required: Yes / No
Guidance: All gas stores	Guidance: All gas stores	Guidance: Where flammable gases and oxidisers are stored.	Guidance: Where flammables and oxidisers are stored.

			
No oil or grease			
Required: Yes / No			
Guidance: Where oxygen or other oxidisers are stored			

			
Danger Gas cylinder store	Danger Risk of asphyxiation	Warning Flammable gas	Warning Oxidising gas
Mandatory	Required: Yes / No	Required: Yes / No	Required: Yes / No
Guidance: For all gas stores/ manifold rooms	Guidance: Based on risk assessment	Guidance: For flammable gases	Guidance: Oxygen and oxidising gases
			
Warning Toxic gas	Warning Corrosive gas	Acetylene	Danger Explosive Atmosphere
Required: Yes / No	Required: Yes / No	Required: Yes / No	Required: Yes / No
Guidance: Toxic gases	Guidance: Corrosive gases	Guidance: Acetylene, use in addition to the flammable gas warning sign	Guidance: Determined by DSEAR Assessment – where explosive atmospheres may occur

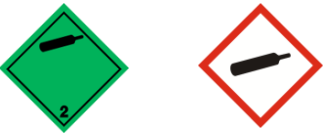
			
Warning Gas cylinder quarantine area	Warning Forklift trucks and other industrial vehicles		
Required: Yes / No	Required: Yes / No		
Guidance: For stores that contain a quarantine area	Guidance: Where vehicles work within the store		

Where additional safety signs are required, see **BS EN 7010-2012** - Graphical symbols - Safety colours and safety signs - Registered safety signs.


3.0 Signs for inside the gas cylinder store.

Select appropriate signs for the store (not all are required). Dangerous goods symbol on the left, GHS symbol on the right. **The boxes shaded grey boxes are for information only and must not be printed on signs.**

Non-Flammable
Non-Toxic

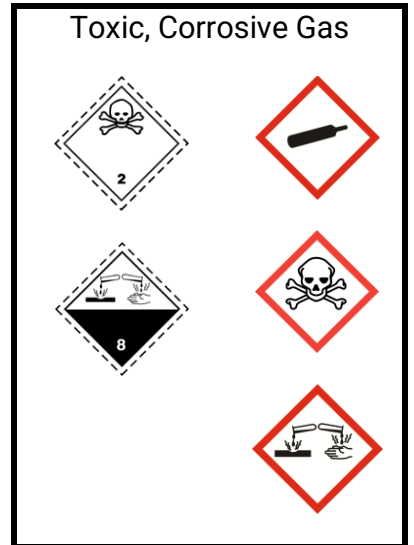
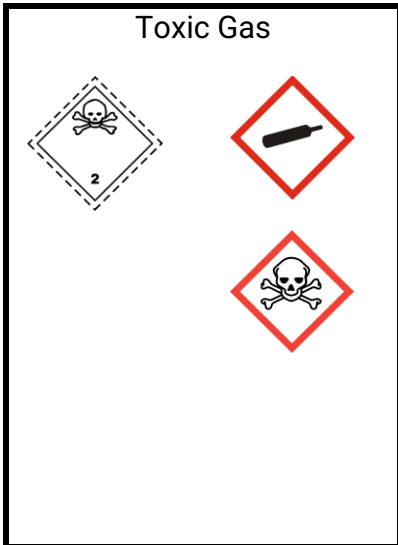


Oxidizing Gas



Flammable Gas





There should be separate storage of full and empty cylinders for each hazard group:

Gas cylinders
Full

Gas cylinders
Empty

