

Cylinders in Fires



Introduction

The purpose of this leaflet is to provide key advice on cylinder storage, handling and use with particular focus on reducing the risk of cylinders becoming involved in a fire. More detailed advice is available from the documents listed in the reference section.

All gas cylinders, whatever the gas content, are potentially dangerous when exposed to fire and may explode.

The Fire & Rescue Service (F&RS) will set up a hazard zone, with a maximum radius of 200m, whilst dealing with a fire where cylinders are involved. Once the fire is extinguished the hazard zone will be collapsed except if Acetylene cylinders are involved as these cylinders require additional cooling. (See decomposition section)

Storage

- Store gas cylinders in a safe place in the open air. Alternatively, store them in a well ventilated building or part of a building specifically reserved for the purpose.
- Store cylinders away from heat sources, flammable or corrosive materials and oils. Cylinders should not be stored in standing water.
- Storage areas should be secure and lockable.
- Ensure cylinders are secured upright.
- Ensure the storage area is designated NO SMOKING.
- Rotate stock on a first in, first out basis – this ensures that cylinders are returned to the supplier for regular legally required safety checks.
- Refer to BCGA publication GN2 for further information.

Handling

- Ensure the safety data sheets for the gases being handled are available. These are freely available from your supplier.
- Cylinders are heavy and should be handled with care. Appropriate manual handling training should be undertaken.
- Do not drop gas cylinders.
- Always use the correctly designed trolley for moving cylinders.
- Always use appropriate personal protective equipment.



Transport

- It is strongly recommended to use an open vehicle. This is particularly important for flammable gas cylinders.
- Ensure cylinder valves are closed.



- Transport acetylene and LPG cylinders upright.
- Ensure cylinders are secure and cannot roll about.
- Ensure compliance with with the latest Carriage of Dangerous Goods (CDG) Regulations.
- For further information, refer to BCGA leaflet L1 Carriage of gas cylinders by road in cars, vans and other vehicles.

Safe use

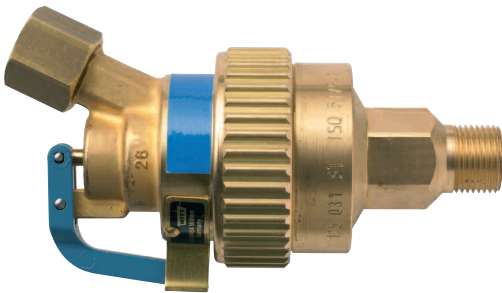
- Before using the gas cylinder ensure that you have read the safety data sheet and understand the properties and hazards associated with the gas.
- Ensure that equipment is designed and constructed to recognised standards and is provided with properly made hose-end connections, regulators, gauges and where appropriate, non-return valves, flame arresters and pressure relief valves.
- Ensure cylinders are secure and not free standing.
- Ensure operatives are fully trained on the use of cylinders, and the gas they contain.
- Always check equipment for leaks after cylinder is connected. Only use a suitable leak detection fluid. In case of a leak, close cylinder valve and rectify before use.
- Keep cylinder and equipment away from sources of heat.
- When cutting and welding prevent any hot material dripping onto equipment and do not direct the torch flame onto the cylinders.
- Always close the cylinder valve after use.
- Purge the equipment prior to and after each use.
- Return cylinders to the cylinder store at the end of each day.

Safe use of Oxygen/Fuel gas cylinders and equipment

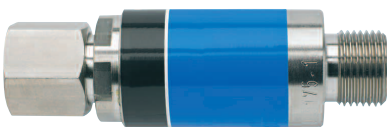
Fires can be caused by flashbacks, where a flame travels back to the gas cylinder. These can be avoided by following the information below.

- Ensure appropriate risk assessments have been conducted in line with current regulations (eg: DSEAR).
- Do not use oxy/fuel gas equipment unless you have been trained.
- Always ignite the fuel gas before introducing the oxygen stream. The nozzle should be pointing upwards for acetylene, downwards for propane.
- Inspect equipment regularly and replace anything damaged or out of date. Follow the inspection and maintenance regimes specified in BCGA CP7 and GN7.
- Ensure that the valves, regulators and flashback arrestors are clean and free from dirt or grease.
- Fit non-return valves (often called check valves) on the torch.
- Check for leaks before lighting up.
- Ensure that the blowpipe/nozzle is not blocked.
- Do not use oxygen/fuel gas equipment without approved flashback arrestors. This is specified in DSEAR ACOP L137.
- There are two types of flashback arrestors available:

Resettable



Non-resettable



(For illustration purposes only)

- If the flashback arrestor continually needs resetting, seek advice from the supplier.
- Flashback arrestors should comply with BSEN 730
- Contact your gas suppliers for detail of how to obtain one of these.

If a flashback occurs:

- Immediately close both the blowpipe/nozzle valves, Oxygen first. (Note: this is opposite to normal closing down procedures)
- Close both cylinder valves.
- Ascertain the cause of the incident and examine all equipment for damage.
- Refer to BCGA document CP7 for more information.

Fire around the cylinder valve outlet:

- If safe to do so, extinguish the flame as quickly as possible
- Close the cylinder valve.

Fire downstream of the regulator:

- If safe to do so, close the cylinder valves (Oxygen first).
- The flame should go out when the fuel gas is shut off. If the flame cannot be put out, evacuate the area and call the Fire and Rescue Service (F&RS).

In the case of acetylene, once the flame is extinguished, or the risk of flashback is over, then check for hotspots by running a bare hand over the cylinder surface.

If a hotspot is detected, or the cylinder begins to vibrate, treat the cylinder as if it has been involved in an external fire.

Acetylene cylinder involved in an external fire

- KEEP AWAY, do NOT approach or attempt to move the cylinder or open the valve.
- Sound the alarm.
- Evacuate the area.
- Contact the Fire and Rescue Service (F&RS).

All cylinders involved in a fire.

- Know what gases you have and where the cylinders are located on your premises as the F&RS will need this information.
- See the safety data sheet for more information.
- Do not use any fire damaged cylinders.
- Inform your supplier whenever a cylinder is involved in a fire. They will collect any fire damaged cylinders within 24 hours of close of the incident.

Cylinder identification

- To help the F&RS identify Acetylene cylinders, should they become involved in a fire, all gas companies are applying a new label to their cylinders.

This is shown below.



Do not remove or tamper with the labels.

Acetylene Decomposition – What is it?

- Acetylene cylinders may react differently to other gas cylinders after exposure to fire due to a chemical reaction called decomposition. This reaction gives out a great deal of heat, which, if unchecked can cause the reaction to accelerate and the cylinder to rupture, even after the fire has been extinguished.
- Decomposition can be initiated from a flashback, by exposure to intense heat, or by shock to a warm fire damaged cylinder.
- The most effective way to control the reaction is to cool the cylinder by applying copious amounts of water to the exterior of the cylinder.
- Acetylene cylinders are designed to minimise the risk of decomposition. They contain a porous mass and a solvent in which the acetylene gas is dissolved. The mass acts as a stabiliser if decomposition was to start.
- F&RS will use the “wetting test” to determine if any decomposition is occurring. When the cylinder passes the wetting test, it is no longer at risk of rupturing and the cordon can be reduced.

References

- BCGA GN2 - Guidance for the Storage of Transportable Gas Cylinders for Industrial Use
- BCGA GN7 – Safe use of Single Portable or Mobile Cylinder Equipment
- BCGA CP7 - The Safe Use of Oxy-Fuel Gas Equipment (Individual Portable or Mobile Cylinder Supply)
- BCGA TIS8 - Information for Customers Collecting Gas Cylinders (Flammable, Inert and Oxidising Gases)
- BCGA L1 - Carriage of gas cylinders by road in cars, vans and other vehicles
- BCGA TIS 15 - Model Risk Assessment for Oxygen and Fuel Gases
- HSE – INDG327 – Take Care with Acetylene
- HSE - ACOP L137
- HSE - INDG 308
- BCGA GN13 - DSEAR Risk Assessment

Gas company emergency contact numbers

Air Liquide	01675 462695	Air Products	0500 02 02 02
BOC	0800 111 333	Energas	01482 329 333

For further information contact your supplier or refer to



British Compressed Gases Association

www.BCGA.co.uk

This publication may be freely produced, except for advertising, endorsement or commercial purposes. 307335/0208

The information it contains is current in February 2008. Please acknowledge the source as British Compressed Gases Association. **CUSTOMER LEAFLET: L6, ISSUE 2 2008**

This leaflet was produced in consultation with the Health and Safety Executive. The HSE believes that the advice contained in this leaflet represents good practice in the industry and commends its use.