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Guidance on the Use and Storage of Gas Cylinders		
Policy...	Code of Practice...	Guidance✓ Procedure...
Organisation-wide✓		Local...
Approved by the University Health & Safety Committee		
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The purpose of presenting this document to the University Health and Safety Committee Standard 3 year re-fresh Changes in practice and/or legislation✓... New Policy...		

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1 Introduction

The University has a responsibility under Health and Safety legislation to provide and maintain plant and systems of work, which are safe, and without risk to health (Health & Safety at Work etc. Act 1974). Accidents involving gas cylinders can cause serious injury or even death. This guidance provides simple practical advice 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 a number of types of pressure receptacle: tube, pressure drum, cryogenic receptacle, bundle of cylinders as well as cylinders themselves, plus the valve(s) fitted directly to the receptacle.

However, for the purpose of this guidance, the term "gas cylinder" shall be taken to mean all these various types of pressure receptacle.

2 Scope

This organisational guidance applies to the Uxbridge campus as a whole.

3 Responsibilities

3.1 Deans and Directors of College Operations, Institutes and/or Professional Services.

Deans and Director of College Operations, Institutes and/or Professional Services are responsible for making the following arrangements:

3.1.1 Ensuring compliance with the requirements of this guidance and bringing this Guidance on the Use and Storage of Gas Cylinders to the attention of those within their areas of responsibility who work with or control gas cylinders.

3.2 Divisional Managers / Head of Departments

Divisional Managers / Head of Departments and or those that work with or control gas cylinders are responsible for:

3.2.1 Ensuring, where applicable, that an inventory is maintained of all gas cylinders within the College/Institute and/or Department. The information should be kept up to date and include cylinders both in use and in storage; the location and type of gas cylinder, record the users and projects to which the gas cylinder is associated with and training records must be kept and training must be regularly updated.

3.2.2 Appointing a responsible person locally to have overall control of gas cylinders in their area; co-ordinate the maintenance and inspection of regulators annually and keep records and ensure that they are replaced or refurbished every 5 years.

3.2.3 Ensuring that both staff and students must be trained in the correct procedures for the use of compressed gases and ensure that all procedures are appropriately supervised.

3.3 Staff and Students (Users)

3.3.1 All users must attend any training required prior to working with gas cylinders to ensure that they are competent to use cylinder gases and users must leak test systems prior to use, using an approved leak test solution.

3.3.2 All users must report any defects to their line manager as soon as they become noticeable and/or reported to them and work in accordance with local standard operating procedures and local rules.

3.3.3 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, its contents and 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 (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.;
- 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.

4 Arrangements

4.1 Use 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;
- breathing (e.g. diving, emergency rescue);
- medical and laboratory uses;
- dispensing beverages;
- fuel for vehicles (e.g. fork-lift trucks);
- extinguishing fires; • heating and cooking;
- Water treatment.

4.2 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 (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;

4.3 The main causes of accidents are:

- * Inadequate training and supervision;
- * Poor installation;
- * Poor examination and maintenance;

- * Faulty equipment and/or design (e.g. badly fitted valves and regulators);
- * Poor handling;
- * Poor storage;
- * Inadequately ventilated working conditions;
- * Incorrect filling procedures;
- * hidden damage.

4.4 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.

4.5 Training

Anyone who examines, 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.

Recommended Training <http://www.gas-safe-interactive.com/university-compressed-cylinders.htm>

In particular:

- new employees should receive training and be supervised closely;
- Training in gas safety needs to be refreshed every 3 years. Areas that use gas must identify who needs training and make arrangements;
- 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.;
- Regulators should only be replaced by trained staff
- Cylinders should only be moved by trained staff

4.6 Handling and Use

Before handling and using gas cylinders, operators should always make sure they understand the properties of the gas they are using, the potential hazards and what actions to undertake in an

emergency. A complete risk assessment should be undertaken on all activities involving the use and movement of gas cylinders.

All persons handling gas cylinders should wear eye protection, protective footwear, and industrial gloves and avoid loose clothing particularly sleeves that may catch on cylinder valves.

- 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 pipe-work make sure that the regulator and pipe-work are suitable for the type of gas and pressure being used.
- **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 (e.g. beer forced into an empty gas cylinder during cylinder change-over).
- **Decanting or trans-filling of gas from one cylinder to another is prohibited**

4.8 Storage

- Gas cylinders should not be stored for excessive periods of time. Only purchase sufficient quantities of gas to cover short-term needs.
- Rotate stocks of gas cylinders to ensure first in is first used.
- 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.
- Do not store Propane with other cylinder gases.
- 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 free-standing.
- 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, e.g. from vehicles such as fork-lift trucks.

5 Operational Guidance

5.1 Techniques for Safe removal/connection of gas cylinder regulators

- Always contact the trained individual to carry out this process.
- Make sure old cylinder valve is turned off and the gas pressure has been released from the regulator.
- Remove the regulator from the cylinder with the appropriate spanner.
- Take care to not damage the regulator when you have removed it. (Place on a solid surface and, if supplied, replace the plastic cap over the threads).
- Remove the old cylinder and replace with the new one in compliance with the previously explained good practice.
- When the new cylinder is strapped back to the bench or cabinet remove the plastic protective cap and check the threads for any damage. (Never use a cylinder that has a broken/removed plastic protective cap).
- DO NOT use grease or oil on the threads of the regulator or cylinder.
- Remove the protective cap from the regulator and screw, finger tight, into the cylinder head.
- Tighten the regulator by holding the cylinder with one hand and tighten with the provided spanner with the other hand.
- Make sure the regulator is turned off; turn the cylinder on full and then half a turn back with the spanner.
- Check the seal with an appropriate leak detection solution, if it bubbles immediately turn off the cylinder (NEVER USE PTFE TAPE TO TRY AND SEAL A LEAK).
- Start the process again from the top. Make sure everything is dry before re-attaching the regulator using a lint free cloth. If it continues to leak report the fault to the suppliers for a replacement.
- When all is safe you may turn on the regulator to the desired pressure and use.
- ALWAYS turn off the cylinder and remove pressure from the regulator when not in use.

6 Emergency Procedures

Emergency procedures should be defined and users should be familiar with what to do in an emergency:

Fire

- Operate the planned fire drill for the area in question. On arrival, emergency services should be informed of the types of gases present in the area affected.
- If possible, isolate any piped supplies to the area affected **but do not take any unnecessary risks.**
- Cylinders may burst, vent or explode when subjected to extreme temperatures so avoid 'first aid' firefighting (e.g. using extinguishers) unless the fire is small and can be dealt with very quickly. Err on the side of safety - if in any doubt, evacuate and leave to the professionals.
- It may be possible to cool cylinders with a hose from a safe distance – the emergency services will decide whether this is appropriate.
- Do not approach any cylinder which has been affected by fire. The emergency services and supplier will deal with matters when safe to do so and the supplier will recover them for disposal.

