

Chemistry Department Standard Operating Procedure
Gas Cylinders
Special Handling and Storage Requirements
Updated: October 2010-Prabha Dwivedi

Potential Hazards.

Fire, asphyxiation, explosive decompression.

Personal Protective Equipment.

Eyewear, protective clothing.

Engineering Controls.

Use cart and proper handling/storage procedures. Always store cylinders with support in an upright position. Any gas cylinder that is being moved - however short the distance - must have a safety cap screwed over the valve on top of the cylinder. This rule is of the utmost importance and applies regardless of the content (harmless, toxic, flammable, and corrosive) and status (full, partial, or empty) of the cylinder.

Never, ever move a cylinder without the safety cap on!

If a cylinder is to be moved more than 2 m, this must be done using a cart specifically designed for this purpose and fitted with a securing chain. Such carts are available from the Main store room Fulmer 23.

All cylinders must be stored in an upright position and secured to a table, lab bench, or wall using an appropriate strap or chain holder as purchased from a laboratory equipment supplier, the storeroom, or custom made by the machine shop. Lecture bottles may be stored on their sides in a secured manner to prevent accidental falls.

The number of gas cylinders stored in any laboratory should be kept to the absolute minimum. Any gas cylinders received on the loading dock should be moved into the laboratory which ordered it the same day it is delivered. Empty gas cylinders should be returned promptly and not stored in the laboratories. There is a monthly rental charge on each cylinder.

Never use excessive force when fitting a pressure-reducing diaphragm regulator to a cylinder. The correct procedure for installing a valve is as follows:

Choose the right regulator with the correct pressure output range for the intended application. Never use adapters for attaching regulators. If in doubt check with the Chemistry Department storeroom and they will help in determining the correct regulator for the gas and cylinder.

Make sure the threads on both the regulator and the cylinder valve are clean and in good condition.

The use of Teflon tape on the threaded connection is not recommended and unnecessary if the regulator and tank threads are in good condition.

Holding the regulator vertically and horizontally at a right angle to the cylinder head, connect it to the cylinder valve by closing the thread finger-tight. The thread should move very easily, if it does not it is either damaged or you are not holding it at a right angle, i.e. you are damaging the threads as you try to

force it in. Using a wrench tighten the connection with a maximum of one turn. Never use excessive force to tighten the connection.

Leak check your connection using either commercially available Snoop* or a mixture of water/isopropanol/dish soap (100:100:1).

With the exception of Nitrogen, Argon, Helium, and air, all gases originating from a compressed gas cylinder must ultimately be vented into a fume-hood. Due to the small gas volumes involved this stipulation is waived for FID, TCD, and etc. detectors on GCs.

Toxic, flammable, and corrosive gases must be stored safely. Only such gases "in service" should be kept in the laboratory.

It is the individual researchers'/supervisors' responsibility that any used or stored gas cylinders as well as feed lines originating from them are kept in good conditions and tested for leakage on a regular basis.

Gases that may react cannot be stored in the same area. (i.e. A hydrogen gas cylinder must not be stored near an oxygen gas cylinder.)

Additional recommendations:

If CO(g) is to be used on a regular basis in any given laboratory (e.g. for hydroformylation studies) an electronic CO(g) sensor should be permanently installed and regularly tested. A written record of these tests should be kept.

The location and type of individual cylinders in the laboratory should be indicated on a floor plan posted to the outside of the laboratory entrance door.

Corrosive gases should not be kept longer than 3 months. Return to supplier, even if there is gas remaining in the cylinder.

Spill and Accident Procedures.

If the cylinder contents are released consult with MSDS and handle appropriately.

Decontamination Procedures.

In most cases this is not applicable. Exceptions are corrosive gases, and in these cases follow the MSDS procedure for cleanup.

Waste Disposal Procedures.

Empty cylinders should be taken to the Departmental store room for return to Central Stores. Lecture bottles should also be returned to the Departmental store room for proper disposal.