

Dangerous Substances and Explosive Atmospheres Regulations 2002 - Safe Handling of Flammable Gases

Safe handling of flammable gases

Do ensure: -

- Minimum numbers of cylinders are used & held in laboratories
- Cylinders are secured to walls or benches with chains or proprietary clamps
- Valves are not opened fully, half a turn is sufficient to ensure optimum gas flow - if fully open it becomes difficult to close in an emergency
- Risk assessments are carried out to determine the potential for an explosive atmosphere when using flammable gases (required by DSEAR)
- Adequate ventilation where flammables gases are used
- All obvious ignition sources are removed from handling areas
- Electrical items not in use are switched off & unplugged
- Storage areas for flammable gases are well ventilated. Enclosed areas must be marked “EX” and all electrical equipment within the storage area is “EX” rated
- Cylinder valves are closed immediately when no longer needed.
- Cylinders are transported in suitable cylinder trolleys by staff trained in manual handling techniques.
- Acetylene cylinders are moved with the valve upright, or allowed to stand for at least 1 hour after moving & before use.
- Acetylene equipment never contains Copper. Acetylene reacts with Silver, Mercury & Copper to form explosive acetylides.
- Acetylene cylinders subject to excess pressure, impact or heat must be checked for temperature rise using the back of the bare hand as acetylene becomes unstable & potentially explosive. Never move or approach a cylinder subjected to excess heat. Call Fire Brigade & cool cylinder using water for at least 1 hour.
- Staff are trained to fit regulators correctly
- Flashback arrestors are fitted to fuel regulators to give flashback protection
- Dry powder fire extinguishers are present in the lab.
- Skin is protected from liquid propane, which freezes on contact with skin.
- Propane gas is only used with special resistant hoses (orange colour).
- Propane is never stored underground & ensure good ventilation at low levels.
- Propane cylinders are not exposed to excess heat.
- Propane cylinders are always transported & used upright.
- Staff are aware Hydrogen is highly flammable & ignites more easily than any other common gas. At high pressure it can self ignite! It burns with an almost invisible flame.
- Everyone knows the emergency procedure in the event of a significant leak of flammable gas – extinguish all flames & heat sources, do not switch electrical appliances on or off, get out & stay out & alert Control on 4444.

Remember - **Combustible Gases** valves are threaded **anti-clockwise** to tighten.

Golden rules of gas cylinder safety

- Never tamper with, attempt to repair, or disguise damage to, a cylinder or cylinder valve – report it.
- Never transfer or “decant” gas from one cylinder to another.
- Never subject cylinders to abnormally high or low temperatures, or mechanical shocks that could damage the valve or safety device.
- Never use cylinders as rollers or supports.
- Never rely on the colour of the cylinder to identify the contents – the label (below valve assembly) is the only sure means of identifying the gas inside the cylinder.
- Don't use unlabeled cylinders.
- Never apply PTFE tape, jointing compounds, lubrication or other sealing materials to valves to try to achieve a gas tight seal - if gas tight seal cannot be achieved, replace regulator or change cylinder.
- Check “O” ring seals are in good condition, if not replace with approved part.
- An “empty” cylinder is never empty - it contains gas at atmospheric pressure!
- Before fitting regulator to cylinder - check valve for particles of dirt or water - use a clean dry cloth to remove any large deposits.
- Fuel gases are given a “smell” to aid leak detection, they also need oxygen & an ignition source for combustion to occur, but once started, are self-propagating. Explosive mixtures vary according to the gas, e.g. Acetylene =2% - 82% and Propane=2% -10%.
- Handle regulators with care - rough treatment can damage springs, diaphragms, valve seats & valves
- Regulators over 5 years old are unsuitable for use with high-pressure cylinders & should be replaced.
- Regulators should only be used with the gas for which they were designed and labelled.
- Using incorrect or damaged regulators on high-pressure gases is potentially hazardous.
- Leave the pressure adjustment knob/screw fully out when the regulator is not in use.
- BCGA CoP 7 requires regulators to be service replaced every 5 years and inspected annually by a competent person and the inspection recorded.
- Air or nitrogen regulators must not be used with Oxygen. serious accidents have occurred when contaminated equipment has been used on oxygen systems.
- Oils or grease are never be allowed to contaminate oxygen regulators, cylinders, pipelines, valves or associated fittings, nor should they be handled by oily or greasy hands, gloves or rags.