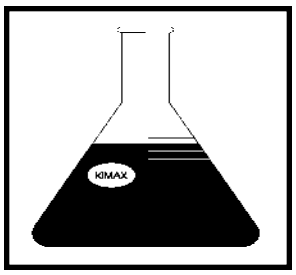
University of California
Environmental Health and Safety
Chemical Safety Update
San Francisco

COMPRESSED GAS CYLINDER SAFETY AND SAFETY PRECAUTIONS IN USE OF CRYOGENIC LIQUIDS

pub # CSU2

Compressed gas cylinders are a common feature in laboratories. These are handy sources of gas for many operations. There are, however, special safety precautions that must be followed when handling them:

- Gas cylinders are difficult to move by hand. To prevent injuries, use specially designed cylinder carts for moving them.
- Secure gas cylinders upright in approved holders or use restrainers. All cylinder restraints must be fixed to a firm structure.
- When a cylinder is not connected to a regulator or manifold, the protective valve cover should be in place.
- Do not handle oxygen cylinders with greasy, oily hands or gloves. The reaction between oxygen and hydrocarbons can be violent, even when minute quantities are involved.
- Store cylinders away from sources of heat.
- Separate incompatible gases as you would other incompatible chemicals. Oxygen and chlorine should be stored as far away as possible from flammables (methane, CO, etc.).
- Dispose of unknown, damaged or rusted cylinders. Do not accumulate empty cylinders.
- If leaks are suspected, apply soap solutions to look for the presence of bubbles to locate the leakage. Never attempt to “sniff” out a suspected leak. Immediately report leaking cylinders with hazardous materials by calling 476-6911.
- Inspect hose and manifold regularly and replace worn hoses. Do not interchange regulators and hose line from one type of gas to another.
- Assume that all cylinders are pressurized. Label empty cylinders clearly and store them away from full ones.
- Open cylinder valves slowly. Never use a wrench on any cylinder that does not rotate with normal handforce.



SAFETY PRECAUTIONS IN USE OF CRYOGENIC LIQUIDS

Cryogens are liquids with boiling points below 200 degrees Kelvin (-73 degrees Centigrade). They are very cold and can cause some materials which come into contact with them to become brittle and lose their mechanical strength. Handling of cryogenic liquids requires special safety precautions. The following is a listing of some important precautions required:

- Cryogenic liquids must be handled by personnel who are familiar with potential hazards.
- Contact with skin can cause severe "cold burns"; therefore, use insulating gloves when handling these liquids.
- Use eye protection (goggles with side shields or face shields) when working with or handling cryogenic liquids.
- Store in well ventilated areas to prevent excessive displacement of air.
- Use only approved storage vessels with pressure relief mechanisms.
- Large liquid-to-gas ratios can cause a small liquid spill to produce large volumes of gas. This in turn can displace the air in a confined space. Therefore, during spills be aware of potential oxygen deficiency.
- In addition to producing an oxygen deficiency by displacement of air, CO_2 also affects the breathing rate. Therefore, its liquid must be used in well ventilated areas.
- Tape outside of glass Dewars to prevent glass fragments from scattering in the event of breakage.
- Avoid transferring of flammable cryogenic fluids within the buildings. Perform the transfers away from sources of ignition.
- “Icing” on the valves and hoses is caused by the solidification of moisture in the air. DO NOT use force to remove the icing.