

	<h2>Compressed Gas Safety</h2>	Effective:	February 06, 2006
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1. Purpose:

To educate people with the safe use and transport of compressed gases.

2. Scope:

These guidelines apply to all faculty, staff and students on campus that use or handle compressed gases.

3. Procedure

Compressed gas cylinders are used in many research and support activities on campus. Cylinders present significant hazards due to the high pressure of gases contained within the cylinders. Persons using or handling cylinders should have basic training on-file with their department or supervisor. At a minimum, this training should include a review of operating and safety protocols for tasks to be performed, review of appropriate Material Safety Data Sheets (MSDS), and hands-on assistance by an experienced gas user. This RUSVM SafetyWeb presents general guidelines for use, transport and storage of gas cylinders.

Using and Transporting Gas Cylinders

- Read the label on the cylinder before connecting a new cylinder of compressed gas. If the label is illegible or missing, return the cylinder to the supplier. Do not rely on stenciling or color of the cylinder. Do not use a cylinder with unidentified contents.
- Keep cylinders upright. Never lay cylinders containing flammable gases on their sides.
- If a gas cylinder valve is damaged, the contents can exit with great force. Cylinders propelled by their contents may penetrate cinder block walls. Cylinders should be affixed via two brackets to a permanent building fixture such as a bench or wall during use or storage. Brackets that can be screwed into the mounting surface are preferred over clamp-type brackets. Refer to the figure at the end of this RUSVM SafetyWeb for recommended storage. Contact Facilities at Ext. 219 if you need cylinder brackets permanently attached to the wall. When the cylinder has no regulator attached, replace the valve cover and screw it down.

- Transport cylinders larger than lecture bottle size with a hand truck. Rolling or "walking" cylinders is extremely hazardous. Never transport a cylinder with a regulator attached! Always protect the valve during transport by replacing the valve cover.
- Select a regulator recommended for use with your cylinder. The pressure, purity, and corrosive properties of the gas will determine the correct regulator. Never attempt to use a cylinder without a regulator or some other pressure-reducing device in place.
- When preparing to withdraw gas from a high-pressure cylinder, close the regulator first. Open the main cylinder valve until it stops and adjust the gas flow rate using the regulator. For cylinders containing fuel gases, open the cylinder valve one-quarter turn, adjusting the regulator as above.
- When you are finished using a compressed gas system, turn off the main cylinder valve, bleed the regulator and lines, and close the regulator. Do not leave the regulator under pressure by closing down flow from the regulator without shutting off the main cylinder valve. Be sure to LOCKOUT upstream gas lines leading to equipment prepared for maintenance. Compressed gases are a hazardous energy source requiring lockout/tagout procedure. Adequately purge lines following lockout procedures and before beginning maintenance.
- Do not drain a cylinder completely. Air can be sucked back through the valve, contaminating the cylinder or creating an explosive mixture.

Precautions for Specific Gases

- Consult the Material Safety Data Sheet for all gases used. Some gases are corrosive (hydrogen chloride), toxic (ethylene oxide), anesthetic (nitrous oxide), or highly reactive (anhydrous ammonia). If you are unsure how to control dangerous properties of a compressed gas, call EH&S at 752-1493.
- Flammable gases such as propane, hydrogen, and acetylene always have a red label. However, the color of the cylinder itself is not a good indicator of flammability as different distributors may use different colored cylinders for the same gas. Check the label for flammability.
- Hazardous gas (arsine, carbon monoxide, hydrogen, phosgene, phosphine, etc.) cylinders should be stored in a suitable exhausted location. If a hazardous gas cylinder develops a leak, evacuate and restrict area access. Remove sources of ignition if the gas is flammable. Call the Safety and Security Dispatch at Ext. 113, or if using a cell phone, **465-6161**.
- Inert gases, such as nitrogen and carbon dioxide must be treated with caution. If left to leak into closed spaces, these gases may displace oxygen and create a risk of asphyxiation.
- Compressed oxygen, while not combustible itself, will cause many materials to burn violently. Never use grease, solvents, or other flammable material on an oxygen valve, regulator, or piping.
- Toxic, corrosive, and pyrophoric gases have special handling and storage requirements. Contact the Safety and Security Department if you plan to use these gasses.

Gas Cylinder Storage

Store cylinders in a well-ventilated area away from ignition sources. Fuel gases must never be stored in an enclosed area, such as a closet. Never store cylinders under stairways or in hallways designated for emergency egress. Keep oxygen cylinders a minimum of twenty feet (20ft) from flammable gas cylinders. If this cannot be done, consult the Safety and Security Department for guidance. Mark empty cylinders "EMPTY" or "MT", close their valves, and segregate them from full cylinders. Protect the valves by installing the valve caps. For outdoor storage, provide drainage, overhead cover, and security. Examples of correct and incorrect storage are shown below. For additional information, contact the Safety and Security Department at Ext. 191 or lnolan@rossvet.edu.kn

