

**SAN DIEGO STATE UNIVERSITY
ENVIRONMENTAL HEALTH & SAFETY DEPARTMENT**

**STANDARD OPERATING PROCEDURES
COMPRESSED GASES**

Standard operating procedures (SOP) are intended to provide you with general guidance on how to safely work with a specific class of chemical or hazard. This SOP is generic in nature. It addresses the use and handling of substances by hazard class only. In some instances multiple SOPs may be applicable for a specific chemical (i.e., both the SOPs for flammable liquids and carcinogens would apply to benzene). If you have questions concerning the applicability of any item listed in this procedure contact Environmental Health & Safety Department (619) 594-6778 or the Principal Investigator of your laboratory. Specific written procedures are the responsibility of the principal investigator.

If compliance with all the requirements of this standard operating procedure is not possible, the principal investigator must develop a written procedure that will be used in its place. This alternate procedure must provide the same level of protection as the SOP it replaces. The Office of Environmental Health and Safety is available to provide guidance during the development of alternate procedures.

Additional requirements may apply if the materials is an acutely toxic compressed gas. Please refer to the SOP for acutely toxic gases if applicable.

Securing of gas cylinders

Cylinders of compressed gases must be handled as high energy sources. They pose a serious hazard if the cylinder valve is dislodged. When storing or moving a cylinder, have the cap securely in place to protect the stem. Use suitable racks, straps, chains or stands to support cylinders.

Do not store cylinders or lecture bottles with the regulator in place. If the regulator fails, the entire contents of the gas cylinder may be discharged.

Decontamination procedures

Not Applicable

Designated area

Compressed gas cylinders which contain acutely toxic gases must be stored in a designated area. See the SOP for acutely toxic compressed gases.

Emergency procedure

Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptoms of overexposure must be developed. The procedures should address as a minimum the following:

Who to contact: (University police, and Office of Environmental Health and Safety, Principal investigator of the laboratory including evening phone number)

The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)

The method used to alert personnel in nearby areas of potential hazards

Special first aid treatment required by the type of compressed gas handled in the laboratory

Eye protection

Eye protection in the form of safety glasses must be worn at all times when handling compressed gases. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must

meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields.

Eyewash

Not applicable.

Fume hood

Manipulation of compressed gases should typically be carried out in a fume hood if the compressed gas is an irritant, oxidizer, asphyxiant, or has other hazardous properties.

Glove (dry) box

Not applicable

Gloves

Not applicable

Hazard assessment

Hazard assessment for work with compressed gases should assure that all staff understands proper use and handling precautions; that all pressurized equipment is properly shielded; regulators are not interchanged between different gas types; all hose connections are properly secured and are appropriate for the pressure(s) used.

EHRS Notification

Not applicable

Protective apparel

Lab coats, closed toed shoes and long sleeved clothing should be worn when handling compressed gases.

Safety shielding

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of compressed gases which pose this risk should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants are acceptable.

Safety shower

Not applicable

Signs and labels

Containers: All compressed gases must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; **chemical formulas and structural formulas are not acceptable.** The compressed gas cylinder should be labeled to indicate if the container is full or empty.

Special storage

Cylinders should be stored in an upright position and secured to a wall or laboratory bench through the use of chains or straps. Cylinder caps should remain on the cylinder at all times unless a regulator is in place. Cylinders should be stored in areas where they will not become overheated. Avoid storage near radiators, areas in direct sunlight, steam pipes and heat releasing equipment such as sterilizers.

Transport compressed gas cylinders on equipment designed for this function. Never carry or "walk" cylinders by hand.

Special ventilation

Manipulation of compressed gas that is an irritant, oxidizer, asphyxiant, or has other hazardous properties outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to compressed gases in the laboratory and are the preferred ventilation control device. If you have questions contact the Office of Environmental Health and Safety to review the adequacy of all special ventilation.

Spill response

In the event of a spill of a compressed gas that is an irritant, oxidizer, asphyxiant, or has other hazardous properties all personnel in the area should be alerted. Vacate the laboratory immediately and call for assistance.

- Office of Environmental Health & Safety, (619) 594-6778
- University Police (619) 594-1991 or 911 from a campus phone. This is a 24 hour service.

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

Vacuum protection

Not applicable

Waste disposal

All empty or partially filled compressed gas cylinders should be returned to the supplier. If the supplier does not accept empty or partially filled cylinders, contact the Office of Environmental Health and Safety concerning disposal.