

Principal Investigator: _____

Date Approved: _____

This document covers basic chemical safety protocols (CSP) for acutely toxic gases and supplements the laboratory Chemical Hygiene Plan as appropriate. Additional lab-specific safety operating procedures for acutely toxic gases may also be required. The use of any acutely toxic gas is subject to pre-approval by the Principal Investigator (PI) and/or the designated Laboratory Responsible Safety Person. DO NOT USE ANY ACUTELY TOXIC GAS UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL AND TRAINING.

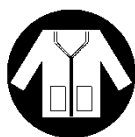
Acutely Toxic Gases

Acutely toxic gases include any gas with a median lethal concentration (LC₅₀) of 500 ppm or less. Many acutely toxic gases act by reacting with water found in the mucous membranes of the lungs and eyes to produce toxic or corrosive by-products.

Examples of acutely toxic gases include chlorine, cyanogen chloride, boron trichloride, and hexafluoroacetone.



Personal Protective Equipment & Personnel Monitoring

**Lab Coat**

Flame-resistant lab coat.

**Gloves**

For proper glove selection, review the chemical safety data sheet and consult glove manufacturer recommendations with your PI or designated Responsible Safety Person.

**Eye Protection**

ANSI Z87.1-compliant safety glasses or safety goggles.

Labeling & Storage

Acutely toxic gases must be stored in a toxic gas cabinet or exhausted enclosure away from combustible materials.

Acutely toxic compressed gas cylinders should be double chained to the inner wall of the toxic gas cabinet or a stable structure within an exhausted enclosure. The first chain should be 1/3 from the bottom of the cylinder and the second chain should be 1/3 from the top of the cylinder. Alternatively, use a cylindrical casing to secure the cylinder within the exhausted enclosure next to your experimental setup. Refer to American Society of Mechanical Engineers code for Process Piping, ASME B31.3, to select compliant piping.

What not to do: Do not use table/bench clamps for securing cylinders. Never store cylinders on transportation carts. Remove regulators from cylinders when not in use and replace with the safety cap. Never use a cylinder without a regulator. Never permit the gas to enter the regulator suddenly. Never try to stop a leak between a cylinder and regulator by tightening the union nut unless the cylinder valve has been closed first. Never strike an electric arc on the cylinder.

Engineering Controls, Equipment & Materials

Fume Hood

If you have any reason to believe that your protocol may generate fugitive toxic gases (e.g., an open system which terminates outside of a fume hood or other exhausted enclosure), contact the Department of Environmental Health, Safety and Sustainability (EHSS) to determine whether alternative engineering controls and/or additional respiratory protection is warranted.

Housekeeping**Waste**

If the vendor does not have a method to return/refill a cylinder, refer to the laboratory *Chemical Hygiene Plan* (Section 6.7) for information on proper chemical waste disposal procedures.

First Aid & Emergencies**Releases**

Immediately notify others in the area of the release and evacuate the location where the release occurred. Notify your PI/Responsible Safety Person and call Vanderbilt University Public Safety (VUPS) at 615-421-1911 or use the VandySafe app on your smart phone. Report any exposure through Risk and Insurance Management's Origami portal and mark that it occurred in research when prompted. Both VUPS and the Origami system will notify EHSS of the incident. Remain on site at a safe distance to provide detailed information to first responders.

Skin or Eye Contact

Without putting yourself at risk, move person into fresh air. Remove contaminated clothing and accessories; flush affected area with water for at least 15 minutes. Get medical attention immediately.

Inhalation

Without putting yourself at risk, move person into fresh air. Get medical attention immediately.

