

Principal Investigator: \_\_\_\_\_

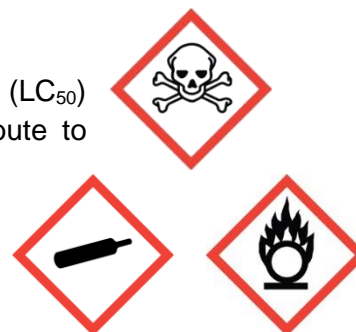
Date Approved: \_\_\_\_\_




This document covers basic chemical safety information for acutely toxic oxidizing gases. The use of any acutely toxic oxidizing gas is subject to pre-approval by the Principal Investigator (PI) and/or Supervisor. PI and/or Supervisor may use the sheet attached to this SOP to document any lab specific training for Acutely Toxic Oxidizing Gases. **DO NOT USE ANY ACUTELY TOXIC OXIDIZING GAS UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL.**

## Acutely Toxic Oxidizing Gases

Acutely toxic gases include any gas with a median lethal concentration (LC<sub>50</sub>) of 500 ppm or less. Acutely toxic oxidizing gases can also contribute to combustion by acting as an oxygen source. These gases can react rapidly and violently with combustible materials or flammable vapors.

Examples of acutely toxic oxidizing gases include fluorine, chlorine dioxide, nitrogen oxides (NO<sub>x</sub>), and chlorine trifluoride. Note: Nitrous oxide (N<sub>2</sub>O) is not acutely toxic, and therefore is not covered by this SOP.



Personal Protective Equipment & Personnel Monitoring		
 <b>Lab Coat</b>	 <b>Gloves</b>	 <b>Eye Protection</b>
Flame resistant lab coat.	For proper glove selection, review the chemical safety data sheet and consult glove manufacturer recommendations with your PI or supervisor.	ANSI Z87.1-compliant safety glasses or safety goggles.

## Labeling & Storage

Acutely toxic oxidizing gases must be stored in a toxic gas cabinet or exhausted enclosure. Keep away from combustible materials, flammable gases, flammable and combustible liquids, finely divided metals, and other easily oxidized substances such as hydrides, sulfur and sulfur compounds, silicon, and ammonia and amine compounds. OSHA regulation 1910.253(b)(4)(iii) requires that combustible cylinders in storage be separated from oxidizing gas cylinders by a minimum distance of 20 feet or by a noncombustible barrier at least five feet high and with a fire resistance rating of least one-half hour.

Ensure compressed gas cylinders are in an upright position to prevent tipping and rolling. This can be achieved by using a strap or chain 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:** Never store cylinders on transportation carts. Never store cylinders with regulators still attached, instead remove the regulator 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 EHS to determine whether alternative engineering controls and/or additional respiratory protection is warranted.

### ***Ordering & Disposal***

As of July 1<sup>st</sup> 2022, Receiving & Stores will no longer coordinate the cylinder gas program for campus departments. Beginning on July 1, departments will enter requisitions for cylinder gases into [49er Mart](#) directly to the mandatory State Term Contract #1214A vendors, Airgas or ARC3 Gases, and deliveries/pickups will be made by the vendors directly to the department. Any order or service issues should be communicated directly to the vendor supplying the cylinder gas, or to the Purchasing Office who will assist the department with any issues encountered.

## **First Aid & Emergencies**

### ***Releases***

Immediately notify others in the area of the release and evacuate the location where the release occurred. Notify your supervisor and call 911 from any campus phone (or 704-687-2200 from a cell phone). Report any exposure to EHS at 704-687-1111. 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.

---

Name	Signature	Date