# STANDARD OPERATING PROCEDURES FOR HAZARDOUS AND PARTICULARLY HAZARDOUS CHEMICALS

For

Carbon Monoxide (CO)

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| 1. PROCEDURE /  PROCESS | Carbon monoxide is used in **Building, Room.** **Insert procedure here:** |
| 2. CHEMICAL NAME(S) and associated  PHYSICAL and  HEALTH HAZARDS | **Carbon monoxide – CAS# 630-08-0;** also known as Carbon oxide; CO; Exhaust gas; Flue gas; Carbonic oxide; Carbon oxide.* Carbon monoxide is a flammable, colorless, odorless, and tasteless compressed gas packaged in cylinders at high pressure. May explode if heated.
* Chemical asphyxiant. Exposure to low concentrations for extended periods may result in dizziness or unconsciousness, and may lead to death.
* Highly toxic/poisonous, binds to myoglobin and mitochondrial cytochrome oxidase.
* Irritant to eyes, skin, mucous membranes and respiratory system. It is harmful by ingestion, inhalation or skin absorption.
* Causes organ damage through prolonged or repeated exposure.
* May damage fertility or the unborn child.
* Signs and symptoms of acute exposure may include headache, flushing, nausea, vertigo, weakness, irritability and unconsciousness. Repeated bouts of carbon monoxide poisoning may cause such as anorexia, headache, lassitude, dizziness and ataxia.
* Used in metal-catalyzed carbonylation reaction of organic compounds.

Flame Pictogram_Gas Cylinder Pictogram_Skull and Crossbones Pictogram_Health Hazard **Signal Word:** **DANGER****Exposure Limits:** **DOSH:** TWA: 35 ppm; STEL: 200 ppm (5 min.); CEIL: 1,500 ppm**NIOSH:** TWA: 35 ppm; CEIL: 200 ppm**ACGIH:** TWA: 25 ppm**Toxicological Data:** Inhalation (LC50): 3,760 ppm 1 hour [Rat]; 1,807 ppm 4 hours [Rat]. \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 3. NAME OF TRAINER / RESOURCE PERSON | **Principal Investigator Name, Building, Room, Phone Number****Secondary contact Name, Building, Room, Phone Number**Persons working on this procedure/material shall be properly trained and documented, such as in the space at the end of this SOP. |
| 1. LOCATION OF

 HEALTH & SAFETY  INFORMATION | The Safety Data Sheet (SDS) for Carbon monoxide is located in the Laboratory Safety Manual in **Building, Room**.Labeling: Containers shall either have original warning label affixed or a label identifying the contents and hazards. |
| 5. PROTECTIVE  EQUIPMENT | Wear safety goggles, flame resistant gloves, and a fully buttoned lab coat. Standard lab attire should include long pants and closed-toe shoes. Lab coat and clothing should be cotton based if possible. Wash hands after removing gloves and before leaving the laboratory. Work within a certified laboratory chemical fume hood. Placing a carbon monoxide detector in the lab is recommended. |
| 1. WASTE DISPOSAL

 PROCEDURES | Excess carbon monoxide gas shall be disposed of by atmospheric venting through the chemical fume hood or other local exhaust ventilation system. |
| 1. DESIGNATED AREA

INFORMATION | The Carbon monoxide gas is stored and dispensed in **Building, Room**.The designated area(s) should be shown on the floor plan in Laboratories’ Chemical Hygiene Plan.**Always work in a properly functioning, certified laboratory chemical fume hood.**  |
| 1. DECONTAMINATION

PROCEDURES | **Upon Accidental Exposure**: In case of **inhalation**, move person to fresh air immediately and seek medical attention by calling 911. If not breathing, give CPR if you are trained.**Upon Accidental Release**:In case of leak, try to close source of gas flow such as cylinder valve if it is safe to do so. If flow of gas cannot be stopped, try to move cylinder to open air environment (such as loading dock), if it is safe to do so and keep people away until cylinder is done venting. If this is not possible, move cylinder close to fume hood or local exhaust ventilation (if safe to do so) and evacuate lab until cylinder has finished venting. If movement of cylinder is not possible evacuate lab immediate. Notify supervisor and EH&S. Call 911 if necessary.As with all accidents, report any exposure as soon as possible to your Principal Investigator or Supervisor. Additional health and safety information on carbon monoxide gas can be obtained by referring to the SDS or by calling the EH&S Office (335-3041). |
| 1. SPECIAL STORAGE

 AND HANDLING  PROCEDURES | * Cylinder storage locations should be well protected, well ventilated, dry and separated from combustible materials.
* Cylinders should never knowingly be allowed to reach a temperature exceeding 125 °F (52 °C).
* Cylinders of carbon monoxide should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 ft., or by a barrier of noncombustible materials of at least 5 ft. high having a fire resistance rating of at least 1/2 hour. If space limitations do not allow for a 20 ft separation from oxygen and other oxidizers, the location must be reviewed by EH&S.
* Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over.
* Protect cylinder from physical damage; do not drag, roll, slide or drop. Use a suitable hand truck for cylinder movement.
* There should be no sources of ignition. All electrical equipment should be explosion proof in the storage and use areas. Storage areas must meet national electric codes for class 1 hazardous areas.
* Store carbon monoxide cylinders away from electrical panels and emergency shower and eyewash.
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**Certification of Hazard Assessment**

Is this document a certification of Hazard Assessment for the processes identified within? ***Yes No***

If yes, provide the name of the person certifying the Hazard Assessment and the date it was performed:

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Name Date

The location of the Hazard Assessment is indicated in the document preceding this form.

**Certificate of Employee Training**

Name of person providing training for employees working with this process:

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The following employees have been trained in when, where and how to use selected PPE, the maintenance, limitations and disposal of the PPE selected, and have demonstrated the correct use of the PPE selected on the reverse of this certification.

**Name**  **Date trained**

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