

# DOHS Carbon Dioxide (CO<sub>2</sub>) Safety Fact Sheet

Consider posting this Fact Sheet where Carbon Dioxide activities are performed.

## General Information

- Carbon dioxide (CO<sub>2</sub>) is a colorless, odorless, non-flammable gas occurring naturally in the atmosphere. CO<sub>2</sub> is naturally produced by body metabolism and is a normal component expelled during breathing.
- CO<sub>2</sub> is commonly used as a gas and can also exist in a solid form (Dry Ice). CO<sub>2</sub> is present in a normal atmosphere typically below 1000 ppm.

## Health Effects

CO<sub>2</sub> when present in the atmosphere in large quantities, can be hazardous. Its primary health effect is asphyxiation due to its ability to displace/deplete atmospheric oxygen. Symptoms may vary based on CO<sub>2</sub> levels of exposure.

- Mild exposure may cause headache and drowsiness.
- High exposure may cause rapid breathing, confusion, and elevated blood pressure.
- Extreme exposure can lead to death by suffocation.

Dry Ice can cause another CO<sub>2</sub> health hazard called frostbite. This can occur when CO<sub>2</sub> solid and vapors off-gassing come in contact. Skin and eye contact should be avoided. Similar effects may occur from compressed CO<sub>2</sub> gas when released from a cylinder.

## OSHA Exposure Guidelines

OSHA has established a Permissible Exposure Limit (PEL) for CO<sub>2</sub> of 5,000 parts per million (ppm) (0.5% CO<sub>2</sub> in air) averaged over an 8-hour workday (time-weighted average or TWA.) The American Conference of Governmental Industrial Hygienists (ACGIH) recommends an 8-hour TWA Threshold Limit Value (TLV) of 5,000 ppm and a Ceiling exposure limit (not to be exceeded) of 30,000 ppm for 10 minutes. A value of 40,000 is considered immediately dangerous to life and health (IDLH value).

## Carbon Dioxide Activities

- ***Ventilation:*** All CO<sub>2</sub> activities should be performed in a well-ventilated area. **A minimum of 6 air exchange rate is recommended.** It is recommended to perform **CO<sub>2</sub> euthanasia** at an exhaust or local exhaust system (Chemical Fume Hood, Downdraft table, and a Ducted BSC).
- ***Compressed CO<sub>2</sub> Gas Cylinder:*** All cylinders must be well secured, labeled, and capped on during storage and transportation.
- Gas Delivery must be turned off after each use especially during manual delivery.

## Safe Handling of Dry Ice

- Dry ice is to be stored in a well-ventilated location and placed in a Styrofoam, chest, insulated cooler, or a special cooler designed to store dry ice.
- Because of the thermal expansion of dry ice (one pound of dry ice produces about 250 liters of gaseous carbon dioxide), do not store it in a tightly sealed container.
- Do not use or store dry ice in confined areas, walk-in refrigerators, environmental chambers, or rooms without ventilation.

## **If a leak is suspected, or there is a spill or rupture of a container:**

- Bethesda: call the NIH Fire Department 301-496-9911 from a cell phone.
- All other locations: Call 911
- Evacuate the area but have someone remain nearby at a safe distance to prevent the entry of others.
- Report to OMS for any health concerns related to an emergency leak.