

## **Safety Message**

**February 2, 2014**

### **Liquid Carbon Dioxide Liquid CO2**

Here is a review of an incident that took Phoenix firefighters responding to an EMS call by surprise. Watch the video and see if you can find the mistakes made and things you would do differently. The issues are clear but we have to expect the unexpected. Use the link below to view the video. There is an MSDS as well here for review; note symptoms on the MSDS and compare patient and descriptions by responders of how they were affected. Below are photos that offer description of the typical Dewar tanks involved in this HAZMAT call and are common all over MC. Dewar tanks can hold a variety of gasses, not just CO2.

#### **VIDEO LINK:**

<http://bcove.me/qtoc654r>

#### **DEWAR TANKS**

In laboratories and industry, vacuum flasks are often used to hold liquefied gases (LN2) for flash freezing, sample preparation and other processes where maintaining an extreme low temperature is desired. Larger vacuum flasks store liquids that become gaseous at well below ambient temperature, such as [oxygen](#) and [nitrogen](#); in this case the leakage of heat into the extremely cold interior of the bottle results in a slow boiling-off of the liquid so that a narrow un-stoppered opening, or a stoppered opening protected by a [pressure relief valve](#), is necessary to prevent [pressure](#) from building up and eventually shattering the flask. The insulation of the vacuum flask results in a very slow "boil" and thus the contents remain liquid for long periods without [refrigeration](#) equipment.

-Wikipedia

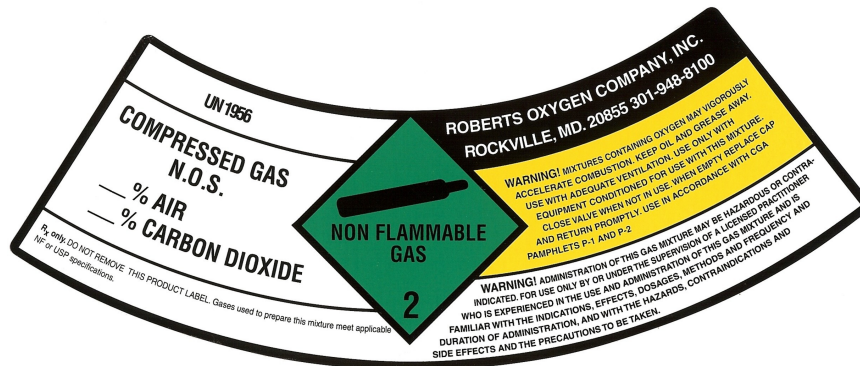
Typical Dewar's Tanks that are common in many Montgomery County facilities:  
(Go to page 2 & 3; label and partial MSDS on page 4-5)





The smaller tank to the left is a typical size found in a doctors office and is holding cryogenics.





## Section 2 : COMPOSITION/ INGREDIENT INFORMATION

C.A.S.	CONCENTRATION %	Ingredient Name	OSHA PEL	ACGIH TLV	OSHA STEL
124-38-9	> 99.8	CARBON DIOXIDE	5000 PPM	5000 PPM	30,000 PPM

## Section 3 : HAZARD IDENTIFICATION

Carbon Dioxide is a colorless gas or a colorless, cryogenic liquid. At low concentrations, the gas is odorless. At higher concentrations it has a sharp, acidic odor. It will act as an asphyxiant and an irritant.

Carbon Dioxide is a powerful cerebral dilator. At concentrations between 2 and 10%, Carbon Dioxide can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. Above 8% nausea and vomiting appear. Above 10%, suffocation and death can occur within minutes.

Contact with the cold gas can cause freezing of exposed tissue. Moisture in the air can lead to formation of carbonic acid that can irritate the eyes. All forms of Carbon Dioxide are noncombustible.

Carbon Dioxide is heavier than air and should not be allowed to accumulate in low lying areas.

**Route of entry:** Inhalation, skin and eye contact.

### Effects of acute exposure

**Eye contact:** Can cause frostbite (liquid form). Vapor may cause a stinging sensation.

**Skin contact:** Can cause frostbite (liquid form). No adverse effects from gas.

**Inhalation:** **May cause dizziness.**  
**Asphyxiant.**  
Can cause vomiting.  
**May result in unconsciousness.**  
**May cause excitation**, excess salivation, rapid breathing.  
May cause headaches and drowsiness.  
**May cause stinging of the nose and throat.**

**Ingestion:** Not a likely route of exposure.

**Effects of chronic exposure:** Damage to retinal ganglion cells and central nervous system may occur due to the presence of carbon dioxide.

**Reproductive effects:** Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

#### Section 4 : FIRST AID MEASURES

Remove contaminated clothing.

Treat for frostbite if necessary by gently warming affected areas.

Consult a physician.

**Eye contact:** Immediately flush eyes with plenty of water for at least 15 minutes.

Consult an ophthalmologist.

**Inhalation:** **RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus should be worn.**

Remove victim(s) to fresh air, as quickly as possible. If not breathing qualified personnel should administer artificial respiration. Get medical attention.

If breathing is difficult, administer oxygen.

**Ingestion:** No first aid should be needed.

Not considered a potential route of exposure.