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# CARBON DIOXIDE

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## MATERIAL SAFETY DATA SHEET

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### SECTION I - Product Identification

**Product name:**.....CO2, Carbon Dioxide, Refrigerated Liquid

**Chemical family:**.....Carbonate

**Date:**.....May 1, 1995

### SECTION II - Hazardous Components

**Forms Carbonic Acid in the presence of water**

### SECTION III - Physical Data

**Boiling point:**.....Sublimation Point: -109.3 F

**Vapor pressure:**.....@ 70 F = 844.7 PSIA

**Solubility in water:**.....@ 68 F Bunsen Coefficient = .8704

**Gas density at 70 F 1 ATM:**.....@ 70 F = .1144 lb/ft<sup>3</sup>

**Freezing point (Triple point):**.....-69.8 F @ 75.1 PSIA

**Appearance and odor:**.....Colorless, odorless in slight concentrations, pungent acid odor when concentrated

**Conversion Factors:**.....1 pound = 8.7 cubic feet

.....1 scf = 0.1144 lb

.....1 gal. liquid = 74 cu/ft

### SECTION IV - Fire and Explosion Hazard Data

CO2 is an inert material that can be introduced into a mass of solid burning material to reduce the burning rate and effect extinguishment. CO2 is not a conductor of electricity and will not break down under continuous electric arcing. It is ideal for electrical vault fires, libraries (paper fires) and around other electrical equipment.

**Flash point:**.....None

**Auto ignition point:**.....None

**Flammable limits % by volume:**.....None

**Extinguishing media:**.....CO2 is a nonflammable, inert gas

**Electrical class:**.....Nonhazardous

**Special fire fighting procedures:**.....Use water spray to cool fire-exposed containers to prevent rupture. This material is not combustible. It can be used as a fire extinguishing agent primarily for its smothering effect (Reduction of oxygen concentration to the point where the immediate atmosphere cannot support combustion).

**Unusual fire and explosion hazard:**....It is not effective for use on fires involving

chemicals that have their own oxygen supply (I.E., Cellulose nitrate); or on fires involving reactive metals Such as, potassium, sodium, magnesium, aluminum, titanium, and zirconium), or their hydrides as these materials can decompose carbon dioxide.

#### SECTION V - Health Hazard Data

**Effects of overexposure:**.....Inhalation nervous system control of respiration is dependent on the CO2 level of breathed in air. By reducing the oxygen level in air, CO2 can cause suffocation.

**Symptoms include:**.....Headache, dizziness, shortness of breath, muscular

weakness, drowsiness and ringing in the ears. High concentrations produce a faint acid taste and can cause paralysis of the breathing control centers of the nervous system: 2% by volume in the atmosphere will cause a 50% increase in the breathing rate; 3%, a 100% rate increase; >4% produces labored breathing and is dangerous for even a few minutes of exposure; >12% causes rapid unconsciousness; a few hours exposure at 25% results in death.

**Emergency first aid:**.....Prompt medical attention is mandatory. Rescue personnel should be equipped with self-contained breathing apparatus.

**Inhalation:**.....Conscious persons should be assisted to an

uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Assure that vomited material does not obstruct the airway by use of position drainage. Medical assistance should be sought

immediately.

**Frostbite:**.....Flush affected areas with lukewarm water. Do not use

hot water. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

### SECTION VI - Reactivity Data

**Stability:**.....Stable

**Conditions to avoid:**.....CO2 is stable under ordinary conditions of use and

storage it does not polymerize. It does cause violent polymerization of acrylaldehyde or ethyleneimine. It decomposes to CO and O2 when heated above 1700 C. This weakly acidic material will react with alkaline materials to form carbonates and bicarbonates.

**Incompatibility:**.....An explosion can occur when CO2 contacts mixtures of

sodium peroxide with aluminum or magnesium. Reactive metals (such as alkali metals, magnesium, aluminum, titanium or zirconium, their hydrates) and materials like diethyl magnesium, moist cesium oxide, or lithium acetylide with ammonia can ignite in a CO2 atmosphere. Dry ice can form shock sensitive mixtures with sodium, potassium, or sodium-potassium alloy.

HAZARDOUS DECOMPOSITION PRODUCT:.....CARBON MONOXIDE

HAZARDOUS POLYMERIZATION WILL NOT OCCUR

### SECTION VII - Spill and Disposal Procedures

**Spill:**.....Forms solid DRY ICE when spilled. Dry ice is very cold, void contact with skin. Ventilate enclosed areas to prevent formation of oxygen deficient atmosphere caused by the sublimation of the dry ice.

**Disposal:**.....Allow gas to bleed off at a moderate rate and/or allow the solid to sublime in a well ventilated area.

### SECTION VIII - Protective Equipment

**Respiratory protection:**.....Use self-contained breathing apparatus in oxygen deficient atmospheres.

**CAUTION ! -- Cartridge respirators will not reduce or remove CO2 from an atmosphere. Use of a respirator in an atmosphere with dangerous levels of CO2, may**

**result in asphyxiation.**

**Ventilation:**.....To prevent accumulation above the TWA.

**Protective gloves:**.....Loose fitting, leather or synthetic.

**Eye protection:**.....Safety goggles or glasses.

**SECTION IX - Storage and Handling Precautions**

**Handling:**.....Provide general and local exhaust ventilation to meet TLV requirements. Provide approved supplied-air or self-contained respirators for use in non-routine or emergency situations with exposure above the TLV. A full face-piece is required for concentrations >10%. Provide standby persons with rescue equipment where work is required at >15% CO<sub>2</sub> in enclosed spaces. Workers should use gloves and may require additional protective clothing (apron face shield, etc. which are resistant to low temp) to prevent freeze burns and frostbite if more than momentary contact with CO<sub>2</sub> at low temperature is possible.

**Storage:**.....Carbon dioxide is heavier than air and leaking gas could accumulate in confined spaces or areas with poor ventilation and cause suffocation.

**SECTION X - Transportation Data and Additional Information**

Liquid CO<sub>2</sub> is technically not a cryogenic liquid because it is not cold enough. Transportation vessels must meet DOT specifications. Liquid CO<sub>2</sub> is transported in vacuum insulated tanks and/or physical insulation material.

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The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

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