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**MSDS: Carbon Dioxide (Dry Ice)**

### PRODUCT INFORMATION

**PRODUCT:** Carbon Dioxide (Dry Ice)  
**TRADE NAME:** Dry Ice, Solid Carbon Dioxide, Carbonice  
**CHEMICAL NAME:** Carbon Dioxide,  
**SYNONYMS:** Carbon Dioxide, Solid  
**FORMULA:** CO<sub>2</sub>  
**CHEMICAL FAMILY:** Carbonate  
**SUPPLIER'S NAME:** MEGS Inc.  
**SUPPLIER'S ADDRESS:** 2675 De Miniac  
Ville St-Laurent, Québec, H4S1E5  
**EMERGENCY PHONE NUMBER:** (514) 956-7503  
**MOLECULAR WEIGHT:** 44.01  
**PRODUCT USE:** Refrigerant and Various Others  
**PRODUCT IDENTIFICATION UN 1845**  
**NUMBER:**

### HAZARDOUS INGREDIENTS

CHEMICAL ID	CONCENTRATION	CAS #	LD(50)	LC(50)
Carbon Dioxide	99+%	124-38-9	None	LC <sub>Lo</sub> Inhl-hmn 10%/1min

### PHYSICAL DATA

**PHYSICAL STATE:** Solid emanating vapour (subliming)  
**APPEARANCE:** Milk-white odourless solid, colourless  
**ODOR:** Odourless gas  
**ODOR THRESHOLD:** Not applicable  
**SPECIFIC GRAVITY (H<sub>2</sub>O = 1):** See Vapour Density (air = 1)  
**VAPOR PRESSURE:** @ 15°C = 5105 KPa  
**VAPOR DENSITY (air = 1):** 1.53  
**EVAPORATION RATE:** Not applicable (gas)  
**BOILING POINT:** Sublimation point = -78.5°C  
**FREEZING POINT:** -56.6°C @ 518 kPa  
**pH:** Not applicable (gas)  
**GAS DENSITY:** 1.861 kg/m<sup>3</sup> @ 15°C, 101.3 kPa

COEFFICIENT OF WATER/OIL @ 15°C, Bunsen Coefficient =  
DISTRIBUTION: 1.0106

### FIRE OR EXPLOSION HAZARD

**CONDITIONS OF FLAMMABILITY:** Non-flammable  
**MEANS OF EXTINCTION:** Non-flammable  
**FLASHPOINT AND METHOD OF DETERMINATION:** Non-flammable  
**UPPER EXPLOSION LIMIT (% BY VOL):** Non-flammable  
**LOWER EXPLOSION LIMIT (% BY VOL):** Non-flammable  
**AUTO-IGNITION TEMPERATURE:** Non-flammable  
**FLAMMABILITY CLASSIFICATION:** Non-flammable  
**HAZARDOUS COMBUSTION PRODUCTS:** Non-flammable  
**EXPLOSION DATA:** Non-flammable  
**SENSITIVITY TO STATIC DISCHARGE:** None

### REACTIVITY DATA

**CHEMICAL STABILITY:** Relatively non-reactive  
**INCOMPATIBLE MATERIALS:** None  
**CONDITIONS OF REACTIVITY:** None  
**HAZARDOUS DECOMPOSITION PRODUCTS:** Gas in an electrical discharge yields carbon monoxide and oxygen

### TOXICOLOGICAL PROPERTIES

#### ROUTES OF ENTRY:

**SKIN CONTACT:** Continuous dermal contact with solid carbon dioxide could cause frostbite or cryogenic "burns".

**SKIN ABSORPTION:** None

**EYE:** None

**INHALATION:** Low concentration (3-5 molar %) cause increased respiration and headache.

Eight to 15 molar % concentrations cause headache, nausea and vomiting which may lead to unconsciousness if not moved to open air or given oxygen.

Higher concentrations cause rapid circulatory insufficiency leading to coma and death.

**INGESTION:** Keep solid carbon dioxide out of the reach of children as they may place it in their mouth and/or swallow it resulting in cryogenic "burns" of frostbite

of the mouth or oesophageal-gastric system.

**ACUTE OVER EXPOSURE EFFECTS:** Carbon dioxide is the most powerful cerebral vasodilator known. Inhaling concentrations greater than 10% cause rapid circulatory insufficiency leading to coma and death.

**CHRONIC OVER EXPOSURE EFFECTS:** Chronic, harmful effects are not known from repeated inhalation of low (3-5 molar %) concentrations.

**EXPOSURE LIMITS:** TWA = 5,000 molar ppm; STEL = 30,000 molar ppm (ACGIH 1995-1996)

**IRRITANCY OF PRODUCT:** See Skin Contact and Ingestion, above.

**SENSITIZATION TO MATERIAL:** None

**CARCINOGENICITY, REPRODUCTIVE EFFECTS:** None

**TERATOGENICITY, MUTAGENICITY:** None

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None

## **PREVENTIVE MEASURES**

**PERSONAL PROTECTIVE EQUIPMENT:** Loose fitting, insulated gloves. Safety goggles or glasses. Safety shoes and solid CO<sub>2</sub> handling "tongs".

**SPECIFIC ENGINEERING CONTROLS:** (FOR GASEOUS CARBON DIOXIDE)  
Dry carbon dioxide can be handled with most common structural materials. Moist carbon dioxide is corrosive by its formation of carbonic acid. For these applications 316, 309 and 310 stainless steels may be used as well as Hastelloy®, A, B & C and Monel®. Ferrous nickel alloys are slightly corroded.

At normal temperatures carbon dioxide is compatible with most plastics and elastomers. Also see CGA Pamphlet G-6-3 Carbon Dioxide Cylinder Filling and Handling Procedures for Beverage Plants.

**LEAK AND SPILL PROCEDURES:** See Handling Procedures and Equipment, below.

**WASTE DISPOSAL:** See Handling Procedures and Equipment, below.

**HANDLING PROCEDURES AND EQUIPMENT:** Solid carbon dioxide is generally delivered to a customer in Kraft-paper-wrapped blocks which weigh approximately 50 pounds and are approximately one half a cubic foot in volume.

The product should be stored in insulated containers which open from the top having loose-fitting lids so that the carbon dioxide vapour from sublimation of the solid may be allowed to escape into the atmosphere.

The insulated storage container should be located in an area where there is adequate ventilation so as to prevent the accumulation of carbon dioxide vapours above the TWA. Carbon dioxide vapours are approximately one half time heavier than air. Also see CGA Pamphlet G-6, Carbon Dioxide.

**STORAGE REQUIREMENTS:** See Handling Procedures and Equipment above.

**TDG CLASSIFICATION:** 9.1

**WHMIS CLASSIFICATION:** None

**SPECIAL SHIPPING INFORMATION:** None

## **FIRST AID MEASURES**

**SPECIFIC FIRST AID PROCEDURES:** PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON DIOXIDE (DRY ICE). 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 assisted resuscitation and supplemental oxygen. Assure that vomited material does not obstruct the airway by use of positional drainage. Medical assistance should be sought immediately.

**EYE CONTACT:** PERSONS WITH POTENTIAL EXPOSURE TO CARBON DIOXIDE (DRY ICE) SHOULD NOT WEAR CONTACT LENSES.

Flush contaminated eye(s) with copious quantities of water. Part eyelids to assure complete flushing. Continue for a minimum of 15 minutes.

**SKIN CONTACT:** 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.

## **PREPARATION INFORMATION**

**PREPARED BY:** Safety Department

**DATE PREPARED:** 09/01/1999

**LAST REVISION DATE:** 05/21/2005

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