WHMIS/US OSHA Material Safety Data Sheet for:

Carbon Dioxide

Section 1: MANUFACTURER/PREPARER INFORMATION & HAZARD WARNINGS

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WHMIS HAZARD SYMBOLS & DEFINITIONS

Class A: Compressed gas

Section 2: HEALTH HAZARD DATA

ROUTES OF ENTRY/SIGNS & SYMPTOMS OF ACUTE EXPOSURE:

EYES/SKIN: Contact with liquid CO2 can cause frostbite. **INHALATION:** In high concentrations CO2 can paralyse the respiratory centre. An increase of CO2 in air will accelerate breathing rate. (2%=50% increase) (5%=300% increase) (12-15% causes unconsciousness). High concentrations will cause suffocation by displacing the oxygen in the air.

Chronic Effects/Carcinogenicity: CO2 is non-toxic and non-carcinogenic.

EMERGENCY & FIRST AID PROCEDURES:

SCBAs MAY BE REQUIRED FOR RESCUE WORKERS.

EYES/SKIN: For frostbite; do not rub the affected area, as tissue damage may occur. Flush with warm water. Do not use hot water. Obtain prompt medical attention. **INHALATION:** Persons suffering from lack of oxygen should be moved into fresh air. If victim is not breathing administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.

Section 3: PREVENTATIVE MEASURES

Respiratory Protection: Positive pressure air line with mask or self-contained breathing apparatus in oxygen-deficient atmospheres. Respirators will not function.

Ventilation: Adequate to avoid lowering oxygen content to below 19.5% (oxygen-deficient atmosphere).

Gloves: Loose-fitting thermal insulated/leather. **Eye Protection:** Full face shield and safety glasses are recommended when handling liquid argon. **Other Protective Equipment:** Long sleeve shirt for liquid handling. Safety shoes if handling cylinders.

Work/Hygienic Practices: Observe all standard industrial hygiene practices when working with compressed gas cylinders.

Handling and Storing: Store and use with adequate ventilation. CO2 is heavier than air and leaking gas could accumulate in low areas or confined spaces causing suffocation without warning. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Use a suitable hand truck for cylinder movement. Do not allow the temperature where cylinders are stored to exceed 52°C. Liquid containers (i.e. 4L cylinders) will vent CO2 if internal pressure builds up, so these containers should be stored in well ventilated areas.

KEEP OUT OF THE REACH OF CHILDREN AND ANIMALS.

N/A=Not Applicable. N/E=Not Evaluated/Established. N/R=Not Reported by Manufacturer.

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Section 4: HAZARDOUS COMPONENTS & EXPOSURE LIMITS

Hazardous Component Name	CAS #	OSHA PEL	ACGIH-TLV	Other Limit	% Wt
Carbon Dioxide	124-38-9	5000 ppm	5000 ppm	30000 ppm STEL	100

§ indicates a toxic chemical subject to the reporting requirements of SARA Title III, Section 313.
† indicates a chemical known to the State of California to cause cancer, birth defects or other reproductive harm per Proposition 65.

Section 5: PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: -78.5°C
Specific Gravity: 1.522 @ 21°C
Vapor Pressure: 838 psig @ 21°C
Percent Volatile: N/A
Vapor Density (Air=1): 0.1144 lb/ft3 @ 21C
Evaporation Rate: N/A
Solubility in Water: 171.3 scc/100 cc @ 0°C
pH: N/A
Appearance/Odor: Colourless, odourless, slightly acidic gas.

Section 6: FIRE & EXPLOSION HAZARD DATA

Flash Point (Method): N/A (Non-flammable gas). **Flammable Limits. LEL**N/A **UEL:** N/A

Extinguishing Media: CO2 neither burns nor supports combustion. Use media appropriate for surrounding fire.

Special Firefighting Procedures: None. CO2 will act as a simple asphyxiant if it displaces oxygen. If possible, remove cylinders from fire area or cool with water to avoid excessive pressure build-up. SCBAs may be required for rescue workers.

Unusual Fire and Explosion Hazards: Pressure can build up due to heat and cylinder may explode if pressure relief devices should fail to relieve pressure.

Section 7: REACTIVITY DATA

Stability: Stable. **Hazardous Polymerisation:** Will not occur. **Conditions to Avoid:** None. **Incompatibility:** None. **Hazardous Decomposition Products:** None.

Section 8: SPILLS, DISPOSAL & ADDITIONAL INFORMATION

Spill/Leak Procedures: Evacuate all unnecessary personnel from affected area. Shut off source of leak if possible. Avoid contact with liquid argon or its cold boil-off gas. To increase rate of evaporation, spray with large amounts of water from upwind. If leak is in container or container valve, contact the supplier's closest location. SCBAs will be required in argon vapour clouds.

Waste Disposal: Do not attempt to dispose of residual or unused quantities. Return to the supplier for proper disposal. For emergency disposal, allow liquid to evaporate in a well-ventilated area or outdoors.

Additional Information: Never strike a welding arc on any compressed gas cylinder. Refilling cylinders without the consent of the cylinder owner is a violation of applicable laws.