AIR LIQUIDE

Material Safety Data Sheet

CARBON DIOXIDE - Compressed (CO2)

Infosafe No. FMOU9 **Issue Date** February 2002 **Status** ISSUED by AIRLIQUI

Not classified as hazardous

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Name CARBON DIOXIDE - Compressed (CO2)

Product Use Inert gas widely used in chemical, food and beverage, petrochemical and metal industries.

Company Name Air Liquide Australia Limited (ABN 57 004 385 782)

Address Level 9, 380 St. Kilda Road Melbourne
Victoria 3004

Emergency Tel. 1800 812588 (24hr)

Telephone Number/Fax Tel:
(03) 9697 9888
Fax:
(03) 9690 7107

Other Names Not Available

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Name	CAS	Proportion
	Carbon Dioxide	124-38-9	99.8 %

3. HAZARDS IDENTIFICATION

Chronic Effects Long term exposure has no known health effects. Prolonged exposure to an oxygen deficient atmosphere (below 18% oxygen in air) may affect the heart and nervous system.

Inhalation

Carbon dioxide is non toxic at normal temperature and pressure. By diluting the oxygen concentration in air below the level necessary to support life, it can act as an asphyxiant.
Effects of oxygen deficiency are: 12-16%: breathing and pulse rate increased, muscular coordination slightly disturbed; 10-14%: emotional upset, abnormal fatigue, disturbed respiration; 6-10%: nausea and vomiting, collapse or loss of consciousness; below 6%: convulsive movements, possible respiratory collapse

	and death.
Ingestion	Not a likely route of exposure as material is gaseous at room temperature.
Skin	No adverse health effects are expected from gas as supplied, however sudden or uncontrolled gas release may cause physical injury. The very low temperatures of liquid Carbon Dioxide can damage skin by Cold Burns or Frost Bite, which are similar to heat burns. Skin on contact with uninsulated cold equipment may stick fast and may be torn on removal.
Eye	No adverse health effects are expected from mixture as supplied, however sudden or uncontrolled gas release may cause physical injury.

4. FIRST AID MEASURES

Inhalation	If victim is conscious: Move to uncontaminated area to breathe fresh air. Keep warm and quiet. If victim is unconcious, move to uncontaminated area and give assisted respiration. When normal breathing restored, treatment as above. Continued treatment should be symptomatic and supportive. N.B. Rescuers should not enter an oxygen deficient atmosphere without using self-contained full face positive pressure breathing equipment.
Ingestion	Not applicable for gases.
Skin	Cold Burns/Frostbite: Flush with lukewarm water for at least 10 minutes, then treat as thermal burns. Seek hospital attention for all but the most superficial cases. Do not apply direct heat or give alcohol or cigarettes. Protect frozen parts from infection.
Eye	Seek medical attention if any effects of exposure persist, or immediately if extending from physical injury.
First Aid Facilities	Eyewash and normal washroom facilities must be provided, and a safety shower is strongly recommended.
Advice to Doctor	Advise doctor that victim has been exposed to an oxygen deficient atmosphere.
Other Information	Hypothermia: Move person to warm place. Wrap in blankets. Seek medical attention. Avoid direct heat.

5. FIRE FIGHTING MEASURES

Extinguishing Media	Use appropriate media to extinguish source of surrounding fire.
Specific Hazards	Carbon dioxide is non-flammable, but container may rupture when heated. Move cylinders from fire if safe to do so. Cool cylinders with water from a protected location. If unable to keep cylinders cool, evacuate area.
Flash Point	Non flammable
Flammable Limits UEL	Not applicable
Flammable Limits LEL	Not applicable
Flammability	Carbon dioxide is non-flammable.

6. ACCIDENTAL RELEASE MEASURES

Other Information	Evacuate the spill area of unnecessary personnel. In enclosed areas rescue personnel should wear AS 1715/1716 approved self contained breathing apparatus. Allow gas to escape to the external atmosphere, or preferably in a fume cupboard or well ventilated, remote area. Do not touch any spilled material. Prevent mixture from entering confined spaces. Leak checking may be done by pressure drop test or by using soapy water on joints and outlets. Shut cylinder valve to stop gas leaks from equipment if possible and safe to do so. If cylinder or cylinder valve is leaking then put on personal protective equipment, shut the cylinder valve, depressurise the equipment, disconnect cylinder from equipment and move the cylinder to a well ventilated area, preferably outdoors, and position to allow gas, rather than liquid to escape. If not possible, allow any

liquid to vapourize. Use of a flammable gas monitor will warn of gas build-up in locality. Notify all relevant local, state and federal government occupational and environmental authorities. If possible, repair the leak or allow the cylinder to vent in external atmosphere. Mark empty cylinders 'defective'. Return all faulty cylinders to supplier/manufacturer.

7. HANDLING AND STORAGE

Storage

Storage of compressed gas cylinders shall be in compliance with State or Territory regulations. Cylinders shall be stored in a cool, dry, well ventilated area out of direct sunlight and away from heat and ignition sources. Outside or detached storage is preferred. No part of cylinders shall be exposed to temperatures above 55°C. Cylinders shall be stored upright on a level, fireproof floor, secure in position and protected from damage. Full cylinders shall be stored separately from empties. Keep cylinder valve cover on. Label empty cylinders and store full cylinders separately from empty ones. Consider leak detection and alarm systems, as required. Limit quantity in storage. Restrict access to storage area and post warning signs. Inspect periodically for deficiencies such as damage or leaks. Have fire extinguishers available in and near the storage area. Comply with all applicable regulations for the storage and handling of compressed gases.

Other Information

Equipment to handle Carbon Dioxide must be constructed of suitable materials for the low temperature encountered. Ascertain the identity of the gas before using it. Colour codes should not be the only criteria used. Do not decant to other cylinders. Know and understand the properties and hazards associated with each gas before using it. Before using compressed gases, establish plans to cover any emergency situations that might arise. Before connecting the cylinder for use ensure that back feed from the system into the cylinder is prevented. Before connecting cylinder, check the complete gas system for suitability particularly for pressure rating and materials. Only experienced and properly instructed persons should handle compressed gases. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When doubt exists as to the correct handling procedure for a particular gas contact the supplier. Ascertain that an adequate supply of water is available for first aid, fire fighting, or dilution of corrosive material in the event of leakage. Employ suitable pressure regulating devices on all cylinders when the gas is being emitted to systems with a lower pressure rating than that of the cylinder.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

National Exposure Standards

Carbon dioxide: TWA 5,000 ppm, 9,000 mg/m3
STEL 30,000 ppm, 54,000 mg/m3

Respiratory Protection

Respiratory equipment that conforms to AS1715/1716 must be used where exposure to material is likely, in view of the asphixiant nature of the gas.

Eye Protection

Chemical goggles or safety glasses should be worn to protect against sudden uncontrolled gas release.

Hand Protection

Leather, PVC or Teflon gloves should worn.

Personal Protective Equipment

Protective leather gloves should be worn.

Footwear

Personnel engaged in the movement of gas cylinders shall be provided with safety footwear.

Body Protection

Overalls or similar protective apparel.

Eng. Controls

Provide adequate local exhaust ventilation system to maintain oxygen concentrations above 18%.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colourless gas, sharp odour.
Melting Point	Not available
Boiling Point	Not available
Solubility in Water	1.716m3/kg
Specific Gravity (H2O=1)	Not available
Vapour Pressure	(15°C) 5090 kPa
Vapour Density (Air=1)	(0°C, 101.3kPa:Air=1) 1.53
Flash Point	Non flammable
Flammability	Carbon dioxide is non-flammable.
Flammable Limits LEL	Not applicable
Flammable Limits UEL	Not applicable
Molecular Weight	44.01
Other Information	Density of Gas (15°C, 101.3kPa) 1.87 kg/m3 Critical Temperature: 31.06°C

10. STABILITY AND REACTIVITY

11. TOXICOLOGICAL INFORMATION

Toxicology Information	Carbon Dioxide is the body's regulator of the breathing function. It is normally present in the air at a concentration of 340ppm by volume. An increase above this level will cause accelerated breathing and heart rate. Concentrations in the order of 10% can cause respiratory paralaysis. Symptoms: Increased rate of breathing which may lead to choking feeling, confusion, exhaustion or unconsciousness. TLV is 5000 ppm. Dangerous to respiration in high concentrations.
Inhalation	Carbon dioxide is non toxic at normal temperature and pressure. By diluting the oxygen concentration in air below the level necessary to support life, it can act as an asphyxiant. Effects of oxygen deficiency are: 12-16%: breathing and pulse rate increased, muscular coordination slightly disturbed; 10-14%: emotional upset, abnormal fatigue, disturbed respiration; 6-10%: nausea and vomiting, collapse or loss of consciousness; below 6%: convulsive movements, possible respiratory collapse and death.
Ingestion	Not a likely route of exposure as material is gaseous at room temperature.
Skin	No adverse health effects are expected from gas as supplied, however sudden or uncontrolled gas release may cause physical injury. The very low temperatures of liquid Carbon Dioxide can damage skin by Cold Burns or Frost Bite, which are similar to heat burns. Skin on contact with uninsulated cold equipment may stick fast and may be torn on removal.
Eye	No adverse health effects are expected from mixture as supplied, however sudden or uncontrolled gas release may cause physical injury.
Chronic Effects	Long term exposure has no known health effects. Prolonged exposure to an oxygen deficient atmosphere (below 18% oxygen in air) may affect the heart and nervous system.

12. ECOLOGICAL INFORMATION

Other Precautions Cylinders should be secured from falling over. Open cylinder valves slowly. Material Compatibility:Dry Carbon Dioxide is non-corrosive hence common materials are acceptable, e.g. steel, iron, copper, brass, plastic. Moist Carbon Dioxide is slightly corrosive, hence acid resistant materials are required.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Waste treatment procedures must be performed by trained, experienced personnel with appropriate protective equipment in approved treatment facilities, and in accordance with all federal, state and local government requirements. Reuse or recycling may also be possible and should be investigated. Alternately, return properly labelled cylinders to the supplier with all valve outlet plugs, caps and protection caps secured, for proper disposal.

14. TRANSPORT INFORMATION

Cylinders should be moved by hand-truck or cart designed for that purpose. Avoid any contact with oil or grease particularly to the cylinder valve. Product is classified as a Dangerous Good Class 2.2 CARBON DIOXIDE, COMPRESSED in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG). Disconnect regulator before transporting or storing cylinders.

U.N. Number	1013
Proper Shipping Name	CARBON DIOXIDE
DG Class	2.2
Hazchem Code	2RE
Packaging Method	3.8.2
Packing Group	
EPG Number	2C1
IERG Number	09

15. REGULATORY INFORMATION

Risk Phrase

Poisons Schedule Not Scheduled

16. OTHER INFORMATION

Contact Person/Point 24 HOUR EMERGENCY CONTACT: The Operator: 1800 812 588

Regional Offices:
Victoria
40 Bunnett Street, North Sunshine 3020. Tel. (03) 9290 1100 Fax (03) 9290 1199
New South Wales
43-47 Pine Road, Fairfield 2165. Tel. (02) 9892 9777 Fax (02) 9892 1454
4 Kullara Close, Beresfield. 2322. Tel (02) 4949 1700 Fax (02) 4949 1750
Lot 5, Shellharbour Road, Port Kembla 2505. Tel. (02) 4274 4044 Fax (02) 4276 3879

South Australia
164 Philip Highway, Elizabeth 5112. Tel. (08) 8209 3600 Fax (08) 8255 9885
Queensland
759 Progress Road, Wacol 4076. Tel. (07) 3246 6363 Fax (07) 3271 2589
Ingham Road, Cnr. Dundee Street,
Bohle, Townsville, 4818
Tel. (07) 4774 8276 Fax (07) 4774 8313
Featherstone Street, Parkhurst
Rockhampton, 4702. Tel. (07) 4936 1066 Fax (07) 4936 1024
68 Bunda Street, Cairns 4870. Tel. (07) 4031 1566 Fax (07) 4051 4293
Tasmania
11 Windsor Street, Invermay 7248. Tel. (03) 6334 9666 Fax (03) 6334 9600
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www.airliquide.com.au

Manufacturers	Carbon dioxide is supplied in high pressure cylinders.
Advice	Cylinder colour: AS 2700 N32 Green Grey Cylinder valve outlet: Industrial: AS 2473 Type 30 Medical: AS 2472 Figure 9
Technical Data	Cylinder colour: French Grey Cylinder valve outlet industrial AS 2473 Type 30 medical AS 2472 Fig 9 Note:Some cyliners filled overseas or used in specific applications may be fitted with a valve with a different outlet.
References	- L'Air Liquide Gas Encyclopedia - Elsevier Scientific Publishing Co. Amsterdam - Australian Code for the Transport of Dangerous Goods by Road and Rail; 6th Edition - List of Designated Hazardous Substances [NOHSC:10005(1994)] - Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:3008(1995) and NOHSC:1003(1995)] - Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)] - EPG Cards; or SAA/SNZ HB76 Initial Emergency Response Guide - Matheson Gas Data Book, 6th Edition, Matheson 1980 - Canadian Liquid Air Montreal, Canada - Gas Products Safety Data Sheets - Tomes Database, Micromedev
Poisons Schedule	Not Scheduled
Molecular Weight	44.01

End of MSDS