



Material Safety Data Sheet

CARBON DIOXIDE - Compressed (CO₂)

InfosafeSM FMOU9 **Issue Date** February 2007 **Status** ISSUED by **BS:** 1.9.11
No. 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 Tel: (03) 9697 9888
Number/Fax 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	May cause redness, itching and irritation. The very low temperatures of liquid Carbon Dioxide can damage skin by Cold Burns or Frost Bite, which are similar to heat burns.
Eye	May cause eye irritation, tearing, stinging, blurred vision, and redness. May cause cold burns or frostbite.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing. Do not give direct mouth-to-mouth resuscitation. To protect rescuer, use air-viva, oxy-viva or one-way mask. Resuscitate in a well-ventilated area. If symptoms develop seek medical attention.
Ingestion	Not applicable for gases.
Skin	Cold Burns/Frostbite: Flush with lukewarm water then treat as thermal burns. Remove contaminated clothing and wash before reuse or discard. If symptoms develop seek medical attention. If molten material adheres to skin, do not attempt to remove. Cool with cold water, wrap loosely with bandage or cloth and immediately seek trained medical attention.
Eye	If contact with the eye(s) occurs, wash with copious amounts of water holding eyelid(s) open. Take care not to rinse contaminated water into the non-affected eye. Seek medical attention.

First Aid Facilities	Normal washroom facilities.
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 Methods	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.
Specific Hazards	Carbon dioxide is non-flammable, but container may rupture when heated.
Hazardous Combustion Products	Under fire conditions this product may emit toxic and/or irritating fumes.
Flash Point	Non flammable
Flammable Limits UEL	Not applicable
Flammable Limits LEL	Not applicable
Flammability	Carbon dioxide is non-flammable.

6. ACCIDENTAL RELEASE MEASURES

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

Handling

Open valves slowly. 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. This product can be an asphyxiant. Do not enter areas where product vapours or mists may exist without respiratory protection or until the atmosphere has been checked. Prevent concentration in hollows and sumps. Build up of mists or vapours in the atmosphere must be prevented. Avoid inhalation of vapour and mists. 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. 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. 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. Do not puncture cylinders. It is essential that all who come into contact with this material maintain high standards of personal hygiene ie. washing hands prior to eating, drinking, smoking or using toilet facilities.

Storage

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. 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.

Handling Temperatures No part of cylinders shall be exposed to temperatures above 55° C.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

National Exposure Standards	Name	STEL (mgm3)	STEL (ppm)	TWA (mgm3)	TWA (ppm)	FootNote
	Carbon Dioxide	54000	30000	9000	5000	

Other Exposure Information As published by the National Occupational Health and Safety Commission (NOHSC):
TWA - the Time-Weighted Average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.
STEL (Short Term Exposure Limit) - the average airborne concentration over a 15 minute period which should not be exceeded at any time during a normal eight-hour workday. According to current knowledge these concentrations should neither impair the health of, nor cause undue discomfort to, nearly all workers.

Respiratory Protection If engineering controls are not effective in controlling airborne exposure then respiratory protective equipment should be used suitable for protecting against airborne contaminants. Final choice of appropriate breathing protection is dependant upon actual airborne concentrations and the type of breathing protection required will vary according to individual circumstances. Expert advice may be required to make this decision. Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices.

Eye Protection Safety glasses with side shields, goggles or full-face shield as appropriate recommended. Final choice of appropriate eye/face protection will vary according to individual circumstances i.e. methods of handling or engineering controls and according to risk assessments undertaken. Eye protection should conform with Australian/New Zealand Standard AS/NZS 1337 - Eye Protectors for Industrial Applications.

Hand Protection Wear gloves of impervious material such as leather, PVC or Teflon gloves. Final choice of appropriate gloves will vary according to individual circumstances i.e. methods of handling or according to risk assessments undertaken. Reference should be made to AS/NZS 2161.1: Occupational protective gloves - Selection, use and maintenance.

Body Protection Wear appropriate clothing including chemical resistant apron where clothing is likely to be contaminated. It is advisable that a local supplier of personal protective clothing is

consulted regarding the choice of material.

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

**Biological
Limit Values** No biological limit allocated.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Colourless gas.

Odour Sharp odour.

Melting Point Not available

Boiling Point Not available

**Solubility in
Water** 1.716 m³/kg

**Specific
Gravity (H₂O=1)** Not available

pH Value Not available

Vapour Pressure 5090 kPa @ 15°C

**Vapour Density
(Air=1)** 1.53 (0°C, 101.3 kPa: Air=1)

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

Stability Stable under normal use conditions.

Hazardous Polymerization	Not available.
Materials to Avoid	Not available.
Conditions to Avoid	Extremes of temperature and direct sunlight.

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 340 ppm by volume. An increase above this level will cause accelerated breathing and heart rate. Concentrations in the order of 10% can cause respiratory paralysis. 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	May cause redness, itching and irritation. The very low temperatures of liquid Carbon Dioxide can damage skin by Cold Burns or Frost Bite, which are similar to heat burns.
Eye	May cause eye irritation, tearing, stinging, blurred vision, and redness. May cause cold burns or frostbite.
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

Environment Protection	Avoid extreme release to the environment.
Mobility	Not available.

Persistence / Degradability Not available.
Ecotoxicity No data available for this specific product.

13. DISPOSAL CONSIDERATIONS

Dispose of waste according to federal, EPA, state and local regulations.

14. TRANSPORT INFORMATION

This material is classified as a Class 2.2 (Non-flammable Non-toxic Gas) Dangerous Good according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. Dangerous goods of Class 2.2 (Non-flammable Non-toxic Gas) are incompatible in a placard load with any of the following:

- Class 1, Explosive
- Class 4.2, Spontaneously Combustible Substance
- Class 5.2, Organic Peroxide

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 Air Liquide W.A. Pty Ltd A.B.N. 52 008 694 166 Wesfarmers Energy Building, Campus Drive (off Murdoch Drive), Murdoch, WA 6150 Tel. (08) 9312 9111 Fax (08) 9313 8108 AIR LIQUIDE AUSTRALIA LIMITED A.B.N. 57 004 385 782 Head Office: 380 St. Kilda Road, Melbourne, Victoria 3004, Australia. Tel. (03) 9697 9888 Fax (03) 9690 7107 www.airliquide.com.au
Manufacturers Advice	Carbon dioxide is supplied in high pressure cylinders. 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 cylinders filled overseas or used in specific applications may be fitted with a valve with a different outlet.

SDS History MSDS Reviewed: February 2007
 MSDS Created: February 2002

Poisons
Schedule Not Scheduled

Molecular
Weight 44.01

End of MSDS

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