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MATERIAL SAFETY DATA SHEET

Product Name:

**CARBON DIOXIDE, Compressed
(CO₂)**

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IDENTIFICATION

Chemical Name: Carbon Dioxide (CO₂)
Synonyms: ALPHAGAZ™ 1 – Carbon Dioxide, Carbon Dioxide, Aligal™2, Lasal™2, Carbon Dioxide - Syphon 1013
UN Number:

Use: Inert gas widely used in chemical, food and beverage, petrochemical, welding and medical applications.

HAZARDS IDENTIFICATION

Dangerous Goods Class and Subsidiary Risk: 2.2
HSNO Classification: Not Hazardous
Hazard Statement: Contains gas under pressure; may explode if heated.
Precautionary Statements: Read label before use.
Read Safety Data Sheet before use.
Protect from sunlight and heat.
Store in a well-ventilated place.
Product is a simple asphyxiant.
Wear protective gloves and eye protection.

COMPOSITION

Ingredients	CAS Number	Proportion
Chemical Entity Carbon Dioxide	124-38-9	100%

Contains no other components or impurities that will influence the classification of the product.

FIRST AID MEASURES**Health Effects****Acute**

Swallowed: Not applicable to gases

Eye: Immediately flush eyes thoroughly with water for at least 15 minutes.

Skin: Not irritating to skin.

Inhaled: Carbon Dioxide is non-toxic, 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:

- 16%: breathing and pulse rate increased, impaired thinking and attention, reduced coordination;
- 14%: Abnormal fatigue upon exertion, emotional upset, faulty coordination, poor judgement;
- 12.5%: Very poor judgement and coordination, impaired respiration that can cause permanent hearing damage, nausea and vomiting;
- below 10%: Inability to perform various movements, loss of consciousness, convulsions, and death.

The effects of carbon dioxide enrichment are:

- 1%: Slight and unnoticeable increase in breathing rate;
- 2%: Breathing becomes deeper and rate will increase above the normal level. Prolonged exposure for several hours may cause a headache and a feeling of exhaustion;
- 3%: Breathing will start to feel laboured and breathing rate will increase to twice the normal rate. Hearing ability will be reduced; blood pressure and pulse rate will increase. Headaches will also be evident.
- 4 – 5%: Breathing rate will increase to four times the normal rate. Signs of intoxication will be evident after ½ hour exposure and you will have a slight choking feeling in addition to the symptoms above.
- 5 – 10%: Carbon dioxide will have a sharp smell. There will be visual disturbance, laboured breathing, headache, and ringing in the ears. Confusion will be followed by loss of consciousness.
- 10 – 100%: Levels above 10% will lead to rapid loss of consciousness. Further exposure at higher concentrations leads to asphyxiation.

Chronic

Long term exposure to carbon dioxide has no known health effects. Prolonged exposure to an oxygen deficient atmosphere (below 19% oxygen in air) may affect the heart and nervous system.

First AidInhalation:

In high concentrations may cause headache, nausea and vomiting, which may lead to unconsciousness as well as asphyxiation. Symptoms of asphyxiation may include loss of mobility/consciousness. Remove victim to uncontaminated area whilst wearing self contained breathing apparatus. Victim may not be aware of asphyxiation. Keep victim warm and rested. Call a doctor. Prompt medical attention is mandatory in all cases of overexposure to Carbon Dioxide. Apply artificial respiration if breathing stopped.

Advice to Doctor

Advise doctor that victim has been exposed to carbon dioxide and an oxygen deficient atmosphere.

In case of dry ice formation:Swallowed:

Seek medical attention immediately. Drink large quantities of water (not hot) to help thaw affected areas.

In case of liquid exiting cylinder and dry ice formation:Skin Contact

Solid or liquid carbon dioxide can cause severe cold burn upon contact with skin.

- In case of cold burn move the victim to a warm place (about 22°C) but do not apply direct heat. Never use dry heat.
- Do not rub frozen parts, as tissue damage may result.
- Gently, flush the affected areas of the skin with large quantities of unheated tap water. Do not use hot water or any other form of direct heat.
- The skin should gradually change colour, via blue, back to pink.
- Loosen any clothing that might restrict the circulation to the affected area but take care not to remove any clothing frozen to flesh.
- Apply DRY, sterile, non-adhering dressing with a large bulky protective covering to protect the wounds
- Do not apply dry sterile dressing too tightly in case it restricts blood circulation. Keep the affected body part at rest. It will become swollen, painful and prone to infection when thawed.
- Treat the person for shock.
- Do not give person alcohol to drink or tobacco to smoke. Both will restrict blood flow to the wound and retard recovery.
- Obtain medical assistance immediately.

General:

Rescuers should not enter an oxygen deficient atmosphere without using self-contained full face positive pressure breathing equipment.

FIRE FIGHTING MEASURES**Flammability:**

Non-flammable.

Fire/Explosion Hazard:

Non-flammable, however exposure to fire may cause container to rupture/explode. Cylinders involved in a fire/explosion may rocket. Move cylinders from vicinity of fire if safe to do so. Cool cylinders by spraying flooding quantities of water from a protected location. If unable to keep cylinders cool, evacuate area, minimum distance 200 meters.

Extinguishing Media:

Use appropriate media to extinguish source of surrounding fire. Cool cylinders with water if possible.

Hazchem Code:

2T

Recommended Protective Clothing:

In confined space use self-contained breathing apparatus.

ACCIDENTAL RELEASE MEASURES**Personal Protection:**

Personnel engaged in the movement of cylinders shall be provided with safety footwear, safety glasses and leather or PVC gloves. Full cover overalls are recommended. In areas where equipment failure may cause an immediate high concentration of carbon dioxide, ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Reference Guide:

Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
AS/NZS 1337 – Eye Protection for Industrial Applications
AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 – Respiratory Protective Devices

General:

Only experienced and properly instructed personnel should handle compressed gases. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

HANDLING AND STORAGE**Handling****Flammability:**

Non Flammable.

General:

Only experienced and properly instructed personnel should handle compressed gases. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

Approved Handlers:

Approved handlers are not required, non hazardous gas (HSNO).

Storage:

Storage of compressed gas cylinders shall be in compliance with New Zealand HSNO Regulations.

Cylinders will be kept away from ignition sources (including static discharges).

Cylinders shall be stored in a cool, dry, well ventilated area out of direct sunlight and away from heat and ignition sources.

No part of cylinders shall be exposed to temperatures above 50°C.

Cylinders shall be stored upright on a level, fireproof floor, secured in position and protected from damage.

Full cylinders shall be stored separately from empties.

Cylinders should be moved by hand-truck or cart designed for that purpose.

Separation:

Avoid any contact with oil or grease particularly to the cylinder valve.

Carbon dioxide can be stored with most common substances.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Standards:**

TWA 5,000 ppm v/v STEL 30,000 ppm v/v

Engineering Controls:

Do not allow backfeed into the cylinder.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Provide adequate local exhaust and dilution (general) ventilation and supply sufficient replacement air to maintain oxygen concentration above 18%.

Personal Protection:

Personnel engaged in the movement of cylinders shall be provided with safety footwear, safety glasses and leather or PVC gloves. Full cover overalls are recommended. In areas where equipment failure may cause an immediate high concentration of carbon dioxide, ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies.

Reference Guide:

AS/NZS 1337 – Eye Protection for Industrial Applications

AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance

AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices

AS/NZS 1716 – Respiratory Protective Devices

PHYSICAL AND CHEMICAL PROPERTIES**Physical Properties**

Appearance:	Colourless, sharp odour	Flashpoint:	non flammable
Sublimation Temp.:	-78.5°C	Flammability Limits:	non flammable
Vapour Pressure:	(at 15°C) 5090 kPa	Solubility in Water (at 0°C):	1.716 m ³ /kg

Other Properties

Relative Density (at 15°C) (Air = 1):	1.53	Density of Gas (101.3 kPa, 15°C):	1.873 kg/m ³
Molecular Weight:	44.01	Critical Temperature:	31.06°C

STABILITY AND REACTIVITY**Flammability:**

Non-flammable.

Materials Compatibility:

Not Applicable

TOXICOLOGY INFORMATION

In high concentrations causes rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness.

ECOLOGICAL INFORMATION

When discharged in large quantities may contribute to the greenhouse effect.

Global warming factor (CO₂=1) : 1

DISPOSAL CONSIDERATIONS

Do not discharge into any place where its accumulation could be dangerous. To atmosphere in large quantities should be avoided.

TRANSPORT INFORMATION

UN Number: 1013
Proper Shipping Name: CARBON DIOXIDE
Dangerous Goods Class and Subsidiary Risk: 2.2
Packing Group: Not applicable
Hazchem Code: 2T
Other Information: Avoid transport on vehicles where the load is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

REGULATORY INFORMATION

ERMA Register Approval No: HSR001018

HSNO Controls: Hazardous Substances (Compressed Gases) Regulations 2004.
Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004.

Approved Handlers: Approved handlers are not required, non hazardous gas (HSNO).

OTHER INFORMATION

Carbon dioxide is supplied in high pressure cylinders.

Cylinder Colour: AS4484-2004 Green Grey PMS 415C
Cylinder Valve Outlet: Industrial: AS 2473 Type 30
Medical: AS 2472 Fig. 17

- References:
- . L'Air Liquide Gaz Encyclopaedia - Elsevier Scientific Publishing Co. Amsterdam
 - . NZS 5433:2007 Transport of Dangerous Goods on Land
 - . ERMA Website – Approvals Register – www.erna.govt.nz
 - . SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
 - . Air Liquide Group MSDS – Carbon Dioxide AL0018A Rev. 1
 - . Air Liquide Australia “Carbon Dioxide” MSDS June 2008
 - . AS1678 2C1 Emergency Procedure Guide – Transport – Non-Flammable, Compressed Gas
 - . AS 4484-2004 - Gas Cylinders for Industrial, Scientific, medical and refrigerant use - labelling and colour coding
 - . AS 2473.2-2007 - Valves for compressed gas outlets - Part 2 Outlet connections (threaded) and stem (inlet) threads
 - . Air Liquide New Zealand Document - DOPM-Z-TECH-0060 Cylinder Reference Manual for Cylinder Identification
 - . CGA Safety bulletin SB2-2007 Oxygen Deficiency
 - . Operators Handbook for the Transport of Dangerous Goods by Road – NZ Road Transport & Logistics Industry Training Organisation
 - . ALNZ - Transport of Gas cylinders in Non-Dedicated Vehicles Customer Information Guide
 - . Work Place Exposure Standards Effective From 2002, Department of Labour, New Zealand
 - . NZCIC Code of Practice – Preparation of Safety Data Sheets

END MSDS

This MSDS summarises to our best knowledge, at the date of issue, the health and safety hazard information regarding this product and general guidance on how to safely handle the product in the workplace. All due care has been taken to include accurate and up-to-date information in this MSDS.

Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact Air Liquide New Zealand.

As far as lawfully possible, no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this MSDS can be accepted.

Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is available on request.

This MSDS has been prepared in accordance with NZCIC Code of Practice – Preparation of Safety Data Sheets.

This MSDS is subject to change without notice. For the latest version of this MSDS visit <http://www.airliquide.com.au/en/technical/new-zealand-msds.html>

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