

CARBON DIOXIDE

MSDS Number: 018A

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name : Carbon Dioxide
 Chemical formula : CO₂
 Synonyms : Carbon dioxide, Carbonic Anhydride, Carbonic Acid Gas, Carbon Anhydride
 Use of the substance/preparation : General Industrial
 Manufacturer/Importer/Distributor : Air Products South Africa (Pty) Ltd.
 4 Spencer Rd,
 Spartan Ext.1,
 Kempton Park, 1620
 Telephone : +27 (0)11 570 5000 (Head Office)
 +27 (0)11 977 6444 (Customer Care Cylinders)
 0800 023 298 (Engineering / Bulk Services)
 Emergency telephone Number (24h) : 0800 650 315

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Components</u>	<u>CAS Number</u>	<u>Concentration (Volume)</u>
Carbon dioxide	124-38-9	100 %

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications.

3. HAZARDS IDENTIFICATION

Main Hazard / Emergency Overview

Can cause rapid suffocation.
 Compressed liquefied gas.
 Avoid breathing gas.
 Direct contact with liquid can cause frostbite.
 Self contained breathing apparatus (SCBA) may be required.

Potential Health Effects

Inhalation : Concentrations of 10% CO₂ or more can produce unconsciousness or death. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.

Eye contact : Contact with liquid may cause cold burns/frost bite.

Skin contact : Contact with liquid may cause cold burns/frost bite.

Ingestion : Ingestion is not considered a potential route of exposure.

Chronic Health Hazard : Not applicable.

Target Organs : None.

Symptoms : Shivering fit. Sweating. Blurred vision. Headache. Increased pulse rate. Shortness of breath. Rapid respiration. Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

4. FIRST AID MEASURES

General advice : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing. Seek medical advice.

Skin contact : Wash frost-bitten areas with plenty of water. Do not remove clothing. Cover wound with sterile dressing.

Ingestion : Ingestion is not considered a potential route of exposure.

Inhalation : Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. In case of shortness of breath, give oxygen.

5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : All known extinguishing media can be used.
- Specific hazards : Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Product is nonflammable and does not support combustion. Move away from container and cool with water from a protected position. If possible, stop flow of product. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out.
- Special protective equipment : Wear self contained breathing apparatus for fire fighting if for fire-fighters necessary.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Evacuate personnel to safe areas. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ventilate the area. Monitor oxygen level.
- Environmental precautions : Should not be released into the environment. Do not discharge into any place where its accumulation could be dangerous. Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
- Methods for cleaning up : Ventilate the area.
- Additional advice : If possible, stop flow of product. Increase ventilation to the release area and monitor oxygen level. If leak is from cylinder or cylinder valve, call the Air Products emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

Only experienced and properly instructed persons should handle compressed gases. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas,

contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Do not remove valve guards. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container.

Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices. Never attempt to lift a cylinder by its valve guard. Always use backflow protective device in piping. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C. Prolonged periods of cold temperature below -30°C should be avoided. Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture.

Storage

Full containers should be stored so that oldest stock is used first. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place.

Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion.

Containers should be stored in a purpose built compound which should be well ventilated, preferably in the open air. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C. Return empty containers in a timely manner.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Engineering measures**

Provide natural or mechanical ventilation to prevent oxygen deficient atmospheres below 19.5% oxygen.

Personal protective equipment

- Respiratory protection : Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere. Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.
- Hand protection : Sturdy work gloves are recommended for handling cylinders. The breakthrough time of the selected glove(s) must be greater than the intended use period.
- Eye protection : Safety glasses recommended when handling cylinders.
- Skin and body protection : Safety shoes are recommended when handling cylinders.
- Special instructions for protection and hygiene : Ensure adequate ventilation, especially in confined areas.

Exposure limit(s)

Carbon dioxide	Time Weighted Average (TWA): EH40 WEL	5,000 ppm	9,150 mg/m ³
Carbon dioxide	Short Term Exposure Limit (STEL): EH40 WEL	15,000 ppm	27,400 mg/m ³
Carbon dioxide	Time Weighted Average (TWA): EU ELV	5,000 ppm	9,000 mg/m ³

9. PHYSICAL AND CHEMICAL PROPERTIES

- Form : Liquefied gas.
- Color : Colorless gas
- Odor : No odor warning properties.
- Molecular Weight : 44.01 g/mol
- Relative vapor density : 1.519 (air = 1)
- Relative density : 0.82 (water = 1)
- Vapor pressure : 57.30 bar (831.04 psia) at 20 °C
- Density : 0.0018 g/cm³ at 21 °C Note: (as vapor)
- Specific Volume : 0.5456 m³/kg at 21 °C
- Boiling point/range : -88.1 °C
- Critical temperature : 31.1 °C

- Melting point/range : -56.6 °C
- Water solubility : 2.000 g/l

10. STABILITY AND REACTIVITY

- Stability : Stable under normal conditions.

11. TOXICOLOGICAL INFORMATION**Acute Health Hazard**

- Ingestion : No data is available on the product itself.
- Inhalation : No data is available on the product itself.
- Skin : No data is available on the product itself.

12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

- Aquatic toxicity : No data is available on the product itself.
- Toxicity to other organisms : No data available.

Persistence and degradability

- Mobility : No data available.
- Bioaccumulation : No data is available on the product itself.

Further information

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

13. DISPOSAL CONSIDERATIONS

- Waste from residues / unused products : Return unused product in original cylinder to supplier. Contact supplier if guidance is required.
- Contaminated packaging : Return cylinder to supplier.

14. TRANSPORT INFORMATION**ADR**

Proper shipping name : CARBON DIOXIDE
 Class : 2.2
 UN/ID No. : UN1013
 Class : 2
 ADR/RID Hazard ID no. : 20

IATA

Proper shipping name : Carbon dioxide
 Class : 2.2
 UN/ID No. : UN1013

IMDG

Proper shipping name : CARBON DIOXIDE
 Class : 2.2
 UN/ID No. : UN1013

RID

Proper shipping name : CARBON DIOXIDE
 Class : 2.2
 UN/ID No. : UN1013

Further Information

Avoid transport on vehicles where the load space 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. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

15. REGULATORY INFORMATION

OHS Act : Occupational Health and Safety Act 85 of 1993 (and Regulations)
 SANS 10265 : The classification and labelling of dangerous substances and preparations for sale and handling
 SANS 10019 : Transportable containers for compressed, dissolved and liquefied gases – Basic design, manufacture, use and maintenance
 SANS 1518 : Transport of dangerous goods – Design, construction, testing, approval and maintenance of road vehicles and portable tanks
 SANS 10228 : The identification and classification of dangerous goods for transport
 SANS 10229-1&2 : Transport of dangerous goods – Packaging and large packaging for road and rail transport Part 1: Packaging / Part 2: Large Packaging
 SANS 10263-2 : The warehousing of dangerous goods Part 2: The storage and handling of gas cylinders

NB: Refer to latest edition

16. OTHER INFORMATION

R-phrases : Not a hazardous substance in accordance with SANS 10265:1999

Ensure all national/local regulations are observed.

Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

(Reference www.airproducts.com :- Air Products PLC Carbon Dioxide
 MSDS Number 300000000020 / Version 1.12 / Revision Date 11.05.2008)