AFROX

MATERIAL SAFETY DATA SHEET

CARBON DIOXIDE

DATE: April 2001

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Chemical Name	CARBON DIOXIDE
Chemical Formula	C02
Trade Names	Technical Carbon Dioxide Industrial Carbon Dioxide Food Carbon Dioxide Instrument Grade Carbon Dioxide Laser Grade Carbon Dioxide Pharmaceutical Grade Carbon Dioxide Carbon Dioxide (N4.5) Medical Carbon Dioxide
Colour coding	With the exception of Medical CO2, all the other grades have Green (H.07) bodies, with the relevant grades stencilled, or denoted by decals, on the bodies of the cylinders. Medical CO2 has a Green (H.07) body with a French Grey (H.30) shoulder .
Valves.	All the above grades are fitted with the 3S-Brass 0,860 inch by 14 tpi right hand male valves.
Company Identification	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel. No: (011) 490-0400 Fax No: (011) 490-0506

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Carbon Dioxide
Chemical Family	Carbon Anhydride
Synonyms	Carbonic Acid Gas
CAS No.	124-38-9
UN No.	1013
ERG No.	120
Hazchem Warning	2 C Non flammable gas

3 HAZARDS IDENTIFICATION

Main Hazards. All cylinders are portable gas containers, and must be regarded as pressure vessels at all times. Carbon dioxide does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in air below the levels necessary to support life. As it is heavier than air it will tend to concentrate at lower levels.

Adverse Health effects. Carbon dioxide acts as a stimulant and depressant on the central nervous system. Increases in heart rate and blood pressure have been noted at a concentration of 7.6 percent, and dyspnea (laboured breathing), headache, dizziness and sweating occur if exposure at that level is prolonged.

Chemical Hazards. Carbon dioxide is relatively non-reactive and non-toxic. In the presence of moisture it can aggressively bring about corrosion in a variety of steel materials.

Biological Hazards. The greatest physiological effect of carbon dioxide is to stimulate the respiratory centre, thereby controlling the volume and rate of respiration. It is able to cause dilation and constriction of blood vessels and is a vital constituent of the acid-base mechanism that controls the pH of the blood.

Vapour Inhalation. At concentrations of 10% and above, unconsciousness can result in one minute or less. Impairment in performance has been noted during prolonged exposure to concentrations of 3% carbon dioxide even when the oxygen concentration was 21%.

Eye Contact No known effect.
Skin Contact No known effect.
Ingestion (See "Vapour Inhalation")

4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to carbon dioxide. Rescue personnel should be equipped with self-contained breathing apparatus. Gaseous carbon dioxide is an asphyxiant. Concentrations of 10% or more can produce unconsciousness or death. Lower concentrations may cause headache, sweating, rapid breathing, increased heartbeat, shortness of breath, dizziness, mental depression, visual disturbances and shaking. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be removed to an uncontaminated area, and given mouth-to-mouth resuscitation and supplemental oxygen.

Eye Contact No known effect.
Skin Contact No known effect.
Ingestion (See Section 3 above).

5 FIRE FIGHTING MEASURES

Extinguishing media. Carbon dioxide is an extinguishing medium.

Specific Hazards. Carbon dioxide does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in the air below the levels to support life.

Emergency Actions. If possible, shut off the source of excess carbon dioxide. Evacuate area. All cylinders should be removed from the vicinity of the fire. Cylinders that cannot be removed should be cooled with water from a safe distance. Cylinders which have been exposed to excessive heat should be clearly identified and returned to the supplier. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing. Self-contained breathing apparatus. Safety gloves and shoes, or boots, should be worn when handling cylinders.

Environmental precautions. Carbon dioxide is heavier than air and could accumulate in low-lying areas. Care should be taken when entering a potentially oxygen-deficient environment. If possible, ventilate the affected area.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions. Do not enter any area where carbon dioxide has been spilled unless tests have shown that it is safe to do so.

Environmental precautions. As carbon dioxide is classified as a "greenhouse" gas, any spillage should be avoided at all times.

Small spills. Shut off the source of escaping carbon dioxide. Ventilate the area.

Large spills. Evacuate the area. Shut off the source of the spill if this can be done without risk. Restrict access to the area until completion of the clean-up procedure. Ventilate the area using forced-draught if necessary.

7 HANDLING AND STORAGE

Do not allow cylinders to slide or come into contact with sharp edges. Carbon dioxide cylinders should be stacked vertically at all times, and should be firmly secured in order to prevent them from being knocked over. Use a "first-in first-out" inventory system to prevent full cylinders from being stored for excessive periods of time. Keep out of reach of children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards. As carbon dioxide is a simple asphyxiant, avoid any areas where spillage has taken place. Only enter once testing has proved the atmosphere to be safe, and remember that the gas is heavier than air.

Engineering control measures. Engineering control measures are preferred to reduce exposure to oxygen-depleted atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level.

Personal protection. Self-contained breathing apparatus should always be worn when entering area where oxygen depletion may have occurred. Safety goggles, gloves and shoes, or boots, should be worn when handling cylinders.

Skin. No known effect.

9 PHYSICAL AND CHEMICAL PROPERTIES

PYSICAL DATA

Chemical Symbol	CO_2
Molecular Weight	44.01
Specific volume @ 20°C & 101,325 kPa	547 ml/g
Density gas @ 101,325 kPa & 20°C	1.839 kg/m^3
Relative density (Air=1) @ 101,325 kPa	1,522
Colour	None
Taste	Acidic
Odour	None

10 STABILITY AND REACTIVITY

Conditions to avoid. The dilution of oxygen in the atmosphere to levels which cannot support life. Never use cylinders as rollers or supports, or for any other purpose than the storing of carbon dioxide. Never expose the cylinders to excessive heat, as this may cause sufficient build-up of pressure to rupture the cylinders.

Incompatible materials. As dry carbon dioxide is inert it may be contained in systems constructed of any of the common metals which have been designed to safely withstand the pressures involved.

Hazardous decomposition products. None

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	TLV 5000 VPM
Skin & eye contact	No known effect
Chronic Toxicity	No known effect
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive Hazards	No known effect

(For further information see Section 3. Adverse Health Effects).

12 ECOLOGICAL INFORMATION

Carbon dioxide is heavier than air and can cause pockets of oxygen-depleted atmosphere in low-lying areas. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods. Small amounts may be blown to the atmosphere under controlled conditions. Large amounts should only be handled by the gas supplier.

Disposal of packaging. The disposal of cylinders must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No.	1013
ERG No	120
Hazchem warning	2C Non-flammable gas

SEA TRANSPORTATION

IMDG	1013
Class	
Packaging group	
Label	Non-flammable gas

AIR TRANSPORTATION

ICAO/IATA Code	1013
Class	2.2
Packaging group	
Packaging instructions	
- Cargo	200
- Passenger	200
Maximum quantity allowed	
- Cargo	150 kg
- Passenger	75 kg

15 REGULATORY INFORMATION

EEC Hazard class	Non-flammable
Risk phrases	R44 Risk of explosion if heated under confinement R58 May cause long-term adverse effects in the environment
Safety phrases	S2 Keep out of reach of children S3 Keep in a cool place S9 Keep container in a well-ventilated place S36 Wear suitable protective clothing S38 In case of insufficient ventilation, wear suitable respiratory equipment

Refer to SABS 0265 for explanation of the above.

16 OTHER INFORMATION

Bibliography

Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition
SABS 0265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY

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