1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: CARBON DIOXIDE
Chemical Formula: CO₂
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 other grades have Green (H.07) bodies, with 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.

Valve:
All above grades are fitted with 3S-Brass 0.860-inch by 14 tpi right-hand male valve.

Company Identification:
African Oxygen Limited
23 Webber Street
Johannesburg, 2001
Tel No: (011) 490-0400
Fax No: (011) 490-0506

EMERGENCY NUMBER: 0860 020202 (24 hours)

2 COMPOSITION/INFORMATION ON INGREDIENTS

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

3 HAZARDS IDENTIFICATION

Main Hazards:
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 dilatation 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%.

4 FIRST AID MEASURES

Eye/Skin Contact: No known effect.
Ingestion: (See Section 3 above)
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 death or unconsciousness. Lower concentrations may cause sweating, headache, rapid breathing, increase heart beat, shortness of breath, dizziness, mental depression, visual disturbance, shaking. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from contaminated area is most important. Unconscious persons should be removed to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen.

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 that have been exposed to excessive heat should be clearly identified and returned to the supplier.

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, 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 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.

9 PHYSICAL AND CHEMICAL

9.1 PHYSICAL DATA

- Chemical Symbol: CO₂
- Molecular Weight: 44.01
- Specific volume @ 20°C & 101,325 kPa: 547 m³/kg
- Density gas @ 101,325 kPa & 20°C: 1.833 kg/m³
- Relative density (Air=1) @ 101,325 kPa: 1.522
- Colour: None
- Taste: None
- 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 that 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. The gas supplier should only handle large amounts.

Disposal of Packaging
The gas supplier must only handle the disposal of cylinders.

14 TRANSPORT INFORMATION

14.1 ROAD TRANSPORTATION
- UN No: 1013
- ERG No: 120
- Hazchem warning: 2C Non-flammable Gas

14.2 SEA TRANSPORTATION
- IMDG: 101

15 REGULATORY INFORMATION

15.1 AIR TRANSPORTATION
- ICAO/IATA Code: 1013
- Class: 2.2
- Packaging group: Cargo: 200, Passenger: 200
- Maximum quantity allowed: Cargo: 150kg, Passenger: 75kg

15.2 LAND TRANSPORTATION
- UN No: 1013
- ERG No: 120
- Hazchem warning: 2C Non-flammable Gas
- IMDG: 101

15.3 NAVAL TRANSPORTATION
- IMDG: 101

15.4 TRANSPORT OF HUMAN OR ANIMAL REMAINS
- IMDG: 101

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

16 OTHER INFORMATION

16.1 Bibliography
- Compressed Gas Association, Arlington, Virginia
- Handbook of Compressed Gases – 3rd Edition
- Matheson, Matheson Gas Data Book – 6th Edition
- SABS 10234 – Globally Harmonized System of classification and labelling of chemicals (GHS)

17 EXCLUSION OF LIABILITY

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