MATERIAL SAFETY DATA SHEET (MSDS)
CARBON DIOXIDE
Please ensure that this MSDS is received by an appropriate person

DATE: March 2023 Version 4
Ref. No.: MS093

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name	CARBON DIOXIDE
Chemical Formula	CO_2
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 CO_2, all other grades have Green (H.07) bodies, with relevant grades stencilled or denoted by decals, on the bodies of the cylinders. Medical CO_2 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	Les Gaz Industriels Ltd Pailles Road G.R.N.W. Republic of Mauritius Tel No: (+230) 212-8306 Fax No: (+230) 212-0235
EMERGENCY NUMBER	(+230) 800 1133

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
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.

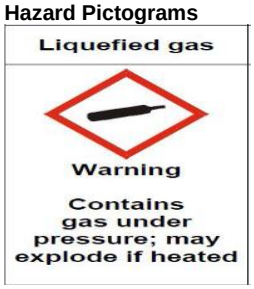
Adverse Health Effects
Carbon dioxide acts as a stimulant and depressant on the central nervous system. Increases in heart rate and blood pressure have been noted at a concentration of 7.6 percent, and dyspnea (laboured breathing), headache, dizziness and sweating occur if exposure at that level is prolonged.

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 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%.

Label Elements
Hazard Pictograms



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 heartbeat, 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 MEA

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. 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.

LES GAZ INDUSTRIELS
UNE VALEUR SÛRE
EST. 1952

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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.
Skin No known effect.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL 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 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

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	150kg
- Passenger	75kg

15 REGULATORY INFORMATION

EEC Hazard class Non-flammable

Risk Phrase	Description	Safety Phrase	Description
R44	Risk of explosion if heated under confinement	S2	Keep out of reach of Children
R58	May cause long-term adverse effects in the environment	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

National legislation OHSAct and Regulations 85 of 1993
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 10234 – Globally Harmonized System of classification and labelling of chemicals (GHS)

17 EXCLUSION OF LIABILITY