
	SAFETY DATA SHEET	Revised edition no : 2 Date : 12/05/2014
	Carbon Dioxide (CO₂)	PG 008 (Next Rev Date Sep 2023)

SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

Trade Name	Technical Carbon Dioxide, Industrial Carbon Dioxide, Food Carbon Dioxide, Medical Carbon Dioxide
Chemical Family	Carbon Anhydride
Chemical Name	Carbon Dioxide
Synonyms	Carbonic Acid Gas
Chemical Abstract no	124-38-9
NIOSH No	N/A
UN no	1013
Company:	PO Box 123884, Alrode, 1451, South Africa Tel : (011) 903 9760 Fax: (011) 903 9766 Cellphone: 082 889 6946 (1 st) 082 885 7475 (2 nd) Info@puregas.co.za Emergency Tel: 0800 172 743 (Rapid Spill Response)

SECTION 2. HAZARDS IDENTIFICATION

Main Hazard	Carbon Dioxide is the most powerful cerebral vasodilator known. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Contact of carbon dioxide snow with the skin may cause frostbite
Flammability	Non flammable
Chemical hazard	Carbon Dioxide is relatively non-reactive and non-toxic. It will not burn or support combustion. On the presence of moisture it can aggressively bring about corrosion in a variety of steel materials
Biological hazard	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
Reproduction hazard	No known effect
Eye effects	No known effect
Health effects – skin	Contact with skin can cause severe frostbite
Health effects – ingestion	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
Health effects – inhalation	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
Carcinogenicity	No known effect
Mutagenicity	No known effect
Neurotoxicity	No known effect


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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS	
Hazardous components	Carbon Dioxide
EEC Classification	Non-flammable
EEC Classification	R44, R58

SECTION 4. FIRST AID MEASURES	
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVER-EXPOSURE TO CARBON DIOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS	
Inhalation	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.
Skin contact	Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. Treat cold burns as frostbite.
Eye contact	Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance
Ingestion	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

SECTION 5. FIRE-FIGHTING MEASURES	
Suitable extinguishing media	Carbon dioxide is itself an extinguishing medium
Special hazards	Containers exposed to fire or severe overheating may burst. 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
Protective Clothing	Self-contained breathing apparatus. Safety gloves and shoes or boots should be worn when handling cylinders

SECTION 6. ACCIDENTAL RELEASE MEASURES	
Personal precautions	Do not enter any area when carbon dioxide has been spilled unless tests have shown that it is safe to do so.
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. 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.

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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 draft if necessary
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SECTION 7. HANDLING AND STORAGE


Suitable material	No data
Handling/storage precautions	Store containers upright and away from heat. 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. Suck back of water into the container must be prevented. Do not allow back feed into the container. Keep container below 50°C in a well-ventilated place

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits	The 1979 ACGIH has recommended a Threshold Limit Value (TLV) of 5000 ppm for carbon dioxide concentration in air to which nearly all workers may be continuously exposed without adverse effects. The Short Term Exposure Limit established (STEL) is 15000 ppm
Engineering control measures	Engineering control measures are preferred to reduce exposure to oxygen depleted atmospheres. General methods include forced-draft ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at or near floor level
Eye protection	Safety glasses
Hand protection	Type approved for handling dry ice
Skin and body protection	Long sleeves and pants. Non-canvas shoes when handling cylinders
Respiratory protection	Self-contained breathing apparatus should always be worn when entering area where oxygen depletion may have occurred.
Other protection	Keep equipment clean and in proper working condition. Use only equipment and components specifically designed for carbon dioxide service

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colourless liquified gas
Odour	No odour warning properties
Melting point/freezing point	-56.6°C
Initial boiling point	-78.5°C (sublimation temperature)

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Flash point	N/A
Flammability (solid, gas)	Non-flammable
Explosive properties	None
Oxidizing properties	None
Vapour pressure	20°C – 57.3 bar
Density	Gas – 1.52 (air = 1) Liquid – 0.82 (water = 1)
Solubility – water	@ 101.325 kPa @ 0°C 0.759 cm ³ /1 cm ³ water
Solubility – solvent	N/A
Solubility - coefficient	N/A

SECTION 10. STABILITY AND REACTIVITY


Conditions to avoid	Do not subject storage containers to rapid heating or excessive temperatures. 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	No known effect

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity	Low concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness.
Chronic toxicity	Low concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive hazards	No known effect

SECTION 12. ECOLOGICAL INFORMATION

Aquatic toxicity – fish	Carbon dioxide is heavier than air, and can cause pockets of oxygen-depleted
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Aquatic toxicity – daphnia	atmosphere in low-lying areas. It does not pose a hazard to the ecology 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
Aquatic toxicity – algae	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
Biodegradability	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
Bio-accumulation	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.
Mobility	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
German wvk	N/A

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

SECTION 14. TRANSPORT INFORMATION

UN no	1013
ADR/RID Substance identity no	1013
ADR/RID class	2.2
ADR/RID item no	N/A
ADR/RID hazard identity no	2.2
IMDG - shipping name	N/A
IMDG – class	2.2
IMDG – packaging group	N/A
IMDG - marine pollutant	N/A
IMDG - EMS No	N/A
IMDG – MFAG table on	N/A
IATA – class	2.2
IATA – subsidiary risk(s)	N/A
UK – description	N/A

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UK emergency action class	N/A
UK classification	N/A
Tremcard No	N/A

SECTION 15. REGULATORY INFORMATION

EEC Hazard Classification	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
Legislation	OSH Act, National Road Traffic Act (when promulgated)

SECTION 16. OTHER INFORMATION

SELECTED BIBLIOGRAPHY

1. *Data sheets as supplied by various Suppliers and Manufacturers*
2. *Emergency Response Handbook - Annex A of SABS 0232-3*
3. *Handling Chemicals Safety, 2nd. Ed. Dutch Association of Safety Experts, Dutch Chemical Industry Association, Dutch Safety Institute, 1980*
4. *NIOSH Pocket Guide to Chemical Hazards, NIOSH, June 1990*
5. *Micromedex, Inc. TOMES CPS™ System Vol. 39*
6. *Patty's Industrial Hygiene Toxicology, 4th ed. Vol. II Part A, George D Clayton, Florence E Clayton*
7. *Supplement to NIOSH Manual of Analytical Methods, 3rd ed., NIOSH Publication No 84-100, 1985*
8. *Toxic & Hazardous Industrial Safety Manual - Industrial Chemicals Safety Manual for Handling and disposal with toxicity and hazard data*
9. *WinSpirs 2.1 as supplied by the Canadian Centre for Occupational Health and Safety.*

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