| PUREGAS | SAFETY DATA SHEET | Version: 4<br>Revision date: 2025-04-24 |
|---|---|---|
| | Carbon Dioxide – $CO_2$<br>Bulk & Compressed | PG-SDS-04 |

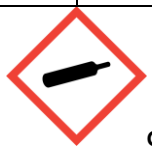
This SDS conforms to the Globally Harmonised System (GHS), South African Regulations on Hazardous Chemical Agents, and SANS 10234, SANS 11014 & SANS 10228.

## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| **Product name** | Carbon Dioxide |
| **Chemical Name** | $CO_2$ (Carbon Dioxide) |
| **Other means of identification** | Carbon Dioxide – Refrigerated, Carbon Dioxide-Liquefied, Carbon Dioxide - Technical & Fire Suppression |
| **Recommended Intended Purpose** | The product is used in various applications and may include - Fire Suppression, Technical processes, the Food Industry and the Medical Industry. Always use as intended. |
| **Company Information** | **Puregas (Pty) Ltd**<br>PO Box 123884, Alrode, 1451, Gauteng, South Africa<br>**Tel:** (011) 903 9760<br>**Fax:** (011) 903 9766<br>**Cellphone:** 082 889 6946 (1st)<br>082 885 7475 (2nd)<br>**Email:** info@puregas.co.za<br>Website: www.puregas.co.za |
| **Emergency Telephone** | 0800 172 743<br>Rapid Spill Response - 24 hours, 7 days a week |

## SECTION 2. HAZARDS IDENTIFICATION

**Classification of the substance - GHS classification as published through ECHA**

| Hazard Classification | Category | Hazard Statement | |
|---|---|---|---|
| Gases under pressure | 2.2 | H280 | Contains gas under pressure; may explode if heated |
| **Hazard Pictograms** |  **GHS04** | | |
| **Signal Word** | **Warning** | | |

**Precautionary Statements**

| | | |
|---|---|---|
| **General:** | P101<br>P102<br>P103 | If medical advice is needed, have product container or label at hand<br>Keep out of reach of children<br>Read carefully and follow all instructions |
| **Prevention** | P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
| **Response** | | None |
| **Storage** | P403 | Store in a well-ventilated place. |
| **Disposal** | | None |
| **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 the 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 |
| **Health Hazards** | No known effects |
| **Other Hazards** | Asphyxiant in high concentrations. Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.<br>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<br>May cause frostbite or freezing of the skin. |

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Substance**

| **CAS No** | **EC No** | **Name** | |
|---|---|---|---|
| 124-38-9 | 204-696-9 | Carbon dioxide | |
| **UN Number:** | 1013 | **EEC Classification** | R44, R58 |

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications.

## SECTION 4. FIRST AID MEASURES

| | |
|---|---|
| **General information** | Adhere to personal protective measures when giving first aid.<br>Seek medical advice immediately. |
| **In case of 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. |
| **In case of skin contact** | In case of frostbite rinse with plenty of water. Don`t remove clothing. In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. |
| **In case of eye contact** | Eye rinsing with water carefully while protecting unhurt eye for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly.<br>Call for a doctor immediately. |
| **In case of ingestion** | Ingestion is not considered a potential route of exposure.<br>Give water to drink if the victim is completely conscious/alert. Do not induce vomiting.<br>Call a doctor immediately |
| **Treatment (Advice to doctor)** | None |

## SECTION 5. FIRE-FIGHTING MEASURES

| | |
|---|---|
| **Suitable extinguishing media** | Carbon dioxide is itself an extinguishing medium |

| | |
|---|---|
| **Unsuitable extinguishing media** | Not applicable |
| **Special hazards arising from the substance** | 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 |
| **Special protective equipment for fire-fighters** | Use a breathing apparatus with an independent air supply (isolated).<br>Wear full protective clothing. |
| **Additional information** | Cool endangered containers with water spray jets.<br>Exposure to fire may cause containers to rupture/explode. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | |
|---|---|
| **Personal precautions** | Do not enter any area where carbon dioxide has been spilt unless tests have shown that it is safe to do so. 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. |
| **Environmental precautions** | As carbon dioxide is classified as a “greenhouse” gas, any spillage should be avoided at all times. |
| **Methods and material for containment and cleaning up** | Small spills – sloe the valve & ventilate the area<br>Big 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 |

## SECTION 7. HANDLING AND STORAGE

| | |
|---|---|
| **Precautions for safe handling** | 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.<br><br>Suck back of water into the container must be prevented. Do not allow back-feed into the container. Keep the container below 50ºC in a well-ventilated place. Do not inhale gases/vapours/aerosols. |
| **General protective measures** | Keep in closed original container.<br>Ventilate store rooms thoroughly.<br>Use transportable pressure equipment. |
| **Hygiene measures** | At work do not eat, drink and smoke.<br>Wash hands before breaks and after work. |
| **Advice on protection against fire and explosion** | Non-flammable<br>Because of the risk of explosion avoid vapours getting into the cellar, sewage system and holes. |
| **Requirements for storage rooms and vessels** | Prevent cylinders from falling over.<br>Ensure the product is compatible with other products in the area. |

## SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

| | |
|---|---|
| **Exposure controls**<br>**Respiratory protection** | Keep self-contained breathing apparatus readily available for emergency use.<br>In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of the risk of suffocation by edging out of air oxygen |
| **Hand protection** | Leather gloves – suitable for handling dry ice |
| **Eye protection** | Safety goggles, in case of increased risk, add a protective face shield. |
| **Skin and body protection** | Safety shoes with steel toes. |
| **Thermal hazard protection** | Long sleeves and pants. Non-canvas shoes when handling cylinders – safety shoes with steel tips. |
| **Engineering Controls** | 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. |

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| Physical state | Colourless liquified gas |
| Colour | Colourless |
| Odour | odourless |
| Odour threshold | None |
| pH | Not applicable |
| Melting point | -56.6 °C |
| Boiling point | -78.5 °C |
| Flash point | Not applicable |
| Critical temperature | 31.0 °C |
| Auto-ignition temperature | Not applicable |
| Decomposition temperature | No data available |
| Flammability (solid, gas) | Not applicable |
| Vapour pressure | 45.1 bar (10 °C) |
| Vapour density | 1.522 (21 °C) |
| Relative density | 1.512 (-56.6 °C ) |
| Solubility : Water | 2000 mg/l (25 °C) |
| Partition coefficient (n-octanol/water) | 0.83 |
| Viscosity, kinematic | No data available |
| Viscosity, dynamic | 0.07 mPa.s (20 °C) |
| Explosive properties | Not applicable |
| Oxidizing properties | Not applicable |
| Molecular weight | 44.01 g/mol (CO2) |

## SECTION 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **Reactivity** | None |
| **Chemical Stability** | Stable under normal conditions |
| **Possibility of Hazardous reactions** | None |

| | |
|---|---|
| **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 a 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

**Information on toxicological effects**

| | |
|---|---|
| **Acute toxicity:** | Not classified |
| **Germ cell mutagenicity:** | Not classified |
| **Carcinogenicity:** | Not classified |
| **Reproductive toxicity:** | Not classified |
| **Note:** | Low concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness. |

## SECTION 12. ECOLOGICAL INFORMATION

| | |
|---|---|
| **Aquatic toxicity – fish** | 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 – daphnia** | 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 |
| **Bioaccumulation** | 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. |
| **Effect on the global warming (CO2=1)** | 1<br>When discharged in large quantities may contribute to the greenhouse Effect. |

## SECTION 13. DISPOSAL CONSIDERATIONS

**Waste treatment methods:**
Small amounts may be blown into the atmosphere under controlled conditions. Large amounts should only be handled by the gas supplier
**Packaging**: The disposal of cylinders must only be handled by the gas supplier

## SECTION 14. TRANSPORT INFORMATION

**UN Pictogram**


**Land and inland navigation transport ADR/RID**
UN No. 1013, Shipping Name CARBON DIOXIDE, ERG No. 120, Class 2.2, Subsidiary Risk Non-flammable, non-toxic gases, Hazchem Warning 2C Non-flammable Gas.

**Marine transport IMDG**
MDG 1013, Shipping Name CARBON DIOXIDE, ERG No. 120, Class 2.2, Subsidiary Risk Non-flammable, non-toxic gases, Label Non-flammable Gas.

**Air transport ICAO/IATA-DGR**
ICAO/IATA Code 1013, Class 2.2, Packing Group: - Packaging instructions - Cargo: allowed - Passenger: allowed

**Special precautions for user**
The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

## SECTION 15. REGULATORY INFORMATION

**Safety, health, and environmental regulations/legislation specific to the substance or mixture:**
Occupational Health and Safety Act, Hazardous Chemical Agents Regulations
SANS 11014:2010 Edition 1
SANS 10228:2012 Edition 6
SANS 10234:2019 Edition 2
SUPPLEMENT TO SANS 10234 Edition 1
National Road Traffic Act
Dangerous Goods Regulations

## 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. GHS Purple booklet
4. Handling Chemicals Safety, 2nd. Ed. Dutch Association of Safety Experts, Dutch Chemical Industry Association, Dutch Safety Institute, 1980
5. NIOSH Pocket Guide to Chemical Hazards, NIOSH, June 1990
6. ECHA
7. Occupational Health and Safety Act, Hazardous Chemical Agents Regulations
8. SANS 11014:2010 Edition 1
9. SANS 10228:2012 Edition 6
10. SANS 10234:2019 Edition 2
11. SUPPLEMENT TO SANS 10234 Edition 1
12. National Road Traffic Act
13. Dangerous Goods Regulations

**Wording of the R/S-phrases specified (not the classification of the mixture!)**
R44 – Risk of explosion if heated under confinement
R58 – May cause long-term adverse effects on the environment
S2 – Keep out of reach of children
S3 – Keep in a cool place
S9 – Keep the container in a well-ventilated place
S36 – Wear suitable protective clothing
S38 – In case of insufficient ventilation, wear suitable respiratory equipment

*Disclaimer:*
*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety, and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*