F&C SAFETY DATA SHEET

Catalog No.: 500102
Product name: Carbon dioxide liquid

1. Identification of the substance/preparation and of the company/undertaking

Identification of the product
Catalogue No.: 500102
Product name: Carbon dioxide liquid

Manufacturer/supplier identification

Company: Fertilizers & Chemicals Ltd.
P.O.box 1428, Haifa 31013, Israel

Contact for information: Tel +972-4-8468178/179 Fax +972-4-8468296

Emergency Tel. No.: +972-4-8468229 Fax +972-4-8468110

2. Composition/information on ingredients
Carbon dioxide.

Synonyms
Carbon dioxide liquefied; Carbon dioxide refrigerated liquid, Carbonic acid anhydride.

CAS-No.: 124-38-9 EC-No.: 204-696-9

Hazardous ingredients:
Name according to EC directives: Carbon dioxide liquefied.

Hazard symbols: R-phrases: 23, 48/23

EC-No.: 204-696-9 toxic by inhalation. Toxic: danger of serious damage to health by prolonged exposure through inhalation.

CAS-No.: 124-38-9 content: (as CO₂) 99.5% min

3. Hazards identification
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Toxic. This product is an odourless, colourless gas which can cause asphyxiation.
Danger of serious damage to health by prolonged exposure through inhalation. Toxic by inhalation. May cause harm to the unborn child.
Caution: Nonflammable high-pressure liquid.

4. First aid measures
After inhalation: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.
After skin contact: In case of frostbite, do not remove clothing. In case of frostbite, thaw frosted parts with water. Flush skin with copious amounts of water for at least 15 minutes. Get medical attention.
After eye contact: rinse out with plenty of water for at least 15 minutes with the eyelid held wide open. Get medical attention.
After swallowing: Wash out mouth with plenty of water. Get medical attention.
Do not give liquids to an unconscious person.

5. Fire fighting measures
Suitable-extinguishing media:
In adaption to materials stored in the immediate neighbourhood. All extinguishing agents allowed.
Use water spray or fog nozzle to keep cylinder/container cool. Move cylinder/container away from fire if there is no risk.
Special risks:
Non-combustible. Container explosion may occur under fire conditions.
Combat fire from a sheltered position.
Development of hazardous combustion gases or vapours possible in the event of fire.
Special protective equipment for fire fighting:
Do not stay in dangerous zone without suitable chemical protective clothing and self-contained breathing apparatus.
6. Accidental release measures

Person-related precautionary measures:
Stay upwind of spill. Evacuate area. Do not inhale vapours/aerosols. Avoid substance contact. Wear self-contained breathing apparatus, protective clothes, rubber boots and cold-insulating gloves when entering areas of suspected or known high concentration of CO₂.

Procedures for cleaning/absorption:
Try to stop leakage. Move leaking cylinder/container to open air if without risk. Ventilate indoor area well to avoid hazardous CO₂ concentrations. CO₂ is heavy gas and will remain in low spots without assisted ventilation. Wash spill site after material pickup is complete. Never direct water jet on liquid.

7. Handling and storage

Handling:
Protect containers against physical damage.
Compressed gas cylinders/storage vessels, contain gaseous/liquid CO₂ at extremely high pressure and should be handled with care.
Keep containers tightly closed when not in use.
Rapid discharge of carbon dioxide generates static electricity, which may ignite (already present) explosive vapour-air mixtures.

Storage:
Outside or detached storage is preferred. Inside storage should be in a cool well-ventilated area.
CAUTION! Do not operate storage vessels above designed pressure or below designed temperature.
Keep away from sources of ignition and heat. Cylinders and high-pressure tubes charged with liquid carbon dioxide must never be allowed to reach a temperature exceeding 51.7 °C.
Store separately from combustible and incompatible materials.
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8 Exposure Controls/personal protection
Specific control parameter
MAK Germany (max. workplace conc.) 5000 ml/m³ or 9100 mg/m³
TLV-TWA (USA, ACGIH) : 5000 ml/m³ or 9100 mg/m³
STEL (USA, ACGIH) 30,000 ppm, 54,000 mg/m³

Personal protective equipment:
Ventilation: Mechanical exhaust required to control exposure below TLV. Ventilate at floor level.
Respiratory protection: Supplied air or self contained breathing apparatus with full face mask operated in the positive pressure mode should be available for emergency use.
Eye protection: Chemical safety goggles and face shield.
Hand protection: Cold insulating gloves if contact possible.
Skin protection: Cold insulating body covering clothes and boots should be available for emergency use. Protective clothing should be selected specifically for the working place depending on concentration and quantity of the hazardous substances handled.

Other protective equipment: Safety shower and eye bath.

9. Physical and chemical properties.
Form: compressed liquefied gas.
M.F: CO₂
M.W.: 44.01
Colour: colourless
Odour: odourless
pH value: not available
Melting temperature: -56.6°C at 5.2 atm
Boiling temperature: -78.5°C (sublimes)
Critical temperature: 31.3°C
Critical pressure: 72.9 atm
Triple point: -56.6 °C at 5.11 atm
Ignition temperature: not available
Vapour pressure: 57.4 atm at 20°C
Vapour density: 1.52 (air = 1)

Flash point: not available
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Explosion limits
  lower not available
  upper not available
Relative vapour density not available
Specific gravity 0.77 g/ml at 57.2 atm
Solubility in water (20°C)
  88 ml CO₂/100 ml water
  0.15 g CO₂/100 ml water

10 Stability and reactivity
Stable under normal conditions.

Conditions to be avoided
Heating and direct sunlight.

Physical dangers
The gas is heavier than air and may accumulate in low ceiling spaces causing
deficiency of oxygen. Built up of static electricity can occur at fast flow rates and may
ignite any explosive mixtures present. Free-flowing liquid condenses to form
extremely cold dry ice.

Substances to be avoided
amines, acrylaldehyde, aziridine, ammonia, aluminum and sodium peroxide
(AL+Na₂O₂). Reacts violently with strong bases and alkali metals. Various metal
dusts such as magnesium, zirconium, titanium, aluminum, chromium and manganese
are ignitable and explosive when suspended and heated in carbon dioxide.

Hazardous decomposition products
The substance decomposes on heating above 2000 °C producing toxic carbon
monoxide (CO). At high temperatures reacts violently with anhydrous ammonia and
various amines.

Hazardous polymerization
will not occur.

11. Toxicological information
RTECS: FF 6425000

Acute toxicity
TLC₀ (ihl-rat) 6 pph/24H

LCL₀ (ihl-hmm) 10 pph/1M
LCL₀ (ihl-hmm) 9 pph/5M
Further toxicological information
After inhalation: High concentrations are dangerous due to increased breathing and heart rates and change in body acidity. Very high concentrations can cause unconsciousness and death. Asphyxiant. Symptoms to be expected: headache, drowsiness, dizziness, euphoria, excitation, spasms, in certain circumstances, narcosis. Removal from exposure results in rapid recovery.
After skin contact: Liquid carbon dioxide may cause redness, frostbite and serious skin burns.
After eye contact: May cause redness, pain, blurred vision.
Carcinogenity: Not listed as a carcinogen by NTP, IARC, ACGIH or OSHA.
Further data
The product should be handled with the care usual when dealing with chemicals.

12. Ecological information
Ecotoxic effects:
Quantitative data on the ecological effect of this product are not available.
Further ecological data:
No ecological problems are to be expected when the product is handled and used with due care and attention.

13. Disposal considerations
Product:
There are no uniform EC Regulations for disposal of chemicals or residues. Chemical residues generally count as special waste. The disposal of the latter is regulated in the EC member countries through corresponding laws and regulations. We recommend that you contact either the authorities or approved waste disposal companies, which will advise you on how to dispose of special waste. Empty pressure vessels could contain dry ice residue. Follow proper disposal technique
Packaging:
Not relevant.

14. Transport information
Transport over land ADR/RID
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ADR/RID class: 2 (2.2) Number and letter: 2A
Name of material: Carbon dioxide liquefied gas.
River transport over ADR/ADNR not examined
Sea transport IMDG
IMDG class: 2 (2.2) UN-No.: 2187 Packaging group: III
Ems: 2-09 MFAG: 615
Correct technical name: Carbon dioxide liquefied gas.
Air transport ICAO-TI and IATA-DGR
ICAO/IATA class: 2 (2.2) UN/ID-No.: 2187 Packaging group: III
Correct technical name: Carbon dioxide liquefied gas

The transport regulations are cited according to international regulations. Possible national deviations in other countries are not considered.

15. Regulatory information
Labeling according to EC Directives
Symbol: Nonflammable compressed gas
R-phrases: 23-48/23
Toxic by inhalation. Toxic: danger of serious damage to health by prolonged exposure through inhalation.

S-phrases: 3-7-23
Keep in a cool place. Keep container tightly closed. Do not breathe gas/vapour.

German regulations
Water pollution class 0 (generally non-water polluting substance)

16. Other information

Date of issue: 14/02/2001
All information, recommendations and suggestions herein concerning our products are based upon tests and data believed to be reliable, however, it is the users responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or impressed or implied is made by F&C, as to the effects of such use, the results to be obtained or the safety and toxicity of the product nor does F&C assume any liability arising out of the use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or governmental regulation.