

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Identification of the substance/preparation: Carbon dioxide (Refrigerated)
Chemical formula : CO₂
Synonyms : Carbon dioxide (refrigerated), liquid carbon dioxide, liquid CO₂, LCO₂
Use of the Substance/Preparation: General Industrial
Manufacturer/Importer/Distributor: CryoService Ltd
Warndon Business Park
Worcester
Email Address – Technical: info@cryoservice.co.uk
Telephone: +44(0)1905 758300
Emergency telephone number: (24h): +44(0)1905 758300

2. HAZARDS IDENTIFICATION**Classification**

Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 1999/45/EC.
No EC labelling required.

Emergency Overview

Extremely cold liquid and gas under pressure.
Direct contact with liquid can cause frostbite.
Can cause rapid suffocation.
Avoid breathing gas.
Self contained breathing apparatus (SCBA) may be required.

Potential Health Effects

Inhalation: Concentrations of 10% CO₂ or more can produce unconsciousness or death. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness with out warning and so rapidly that victim may be unable to protect themselves.

Eye contact: Contact with liquid may cause cold burns/frost bite.

Skin contact: Contact with liquid may cause cold burns/frost bite. May cause severe frost bite.

Ingestion: Ingestion is not considered a potential route of exposure.

Chronic Health Hazard: Not applicable.

Aggravated Medical Condition: None.

Target Organs: None.

Symptoms: Shivering fit. Sweating. Blurred vision. Headache. Increased pulse rate. Shortness of breath. Rapid respiration. Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation: Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (volume)	Classification
Carbon dioxide	204-696-9	124-38-9	100 %	

Concentration is nominal. For the exact product composition, please refer to CryoService technical specifications.

4. FIRST AID MEASURES

General advice:	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Eye contact:	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing.
Skin contact:	In case of frostbite, obtain medical treatment immediately. Wash frost-bitten areas with plenty of water. Do not remove clothing. Do not rub frozen parts as tissue damage may result. Cover wound with sterile dressing. As soon as practical, place the affected area in a warm water bath- which has a temperature not to exceed 40°C (105 °F).
Ingestion:	Ingestion is not considered a potential route of exposure.
Inhalation:	Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. In case of shortness of breath, give oxygen.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	All known extinguishing media can be used.
Specific hazards:	Spill will rapidly vaporize forming an carbon dioxide enriched and oxygen deficient vapor cloud. Vapor cloud may obscure visibility. Product is non flammable and does not support combustion. Do not direct water spray at container vent. Move away from container and cool with water from a protected position. Keep containers and surroundings cool with water spray.
Special protective equipment for fire-fighters:	Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Evacuate personnel to safe areas. Ventilate the area. Monitor carbon dioxide and oxygen levels. Wear self-contained breathing apparatus when entering the area unless atmosphere is proved to be safe.
Environmental precautions:	Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Do not discharge into any place where its accumulation could be dangerous.
Methods for cleaning up:	Ventilate the area.
Additional advice:	If possible, stop flow of product. Increase ventilation to the release area and monitor carbon dioxide and oxygen levels. Vapor cloud may obscure visibility. Do not spray water directly at leak. If leak is from cylinder or cylinder valve, call the CryoService emergency telephone number. If the leak is in the user's system, close the supply valve and safely vent the pressure before attempting repairs.

7. HANDLING AND STORAGE

Handling

Know and understand the properties and hazards of the product before use. Only experienced and properly instructed persons should handle compressed gases. Before using the product, determine its identity by reading the label. Do not remove or deface labels provided by the supplier for the identification of the container contents. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. If user experiences any difficulty operating container valve discontinue use and contact supplier. Do not remove or interchange connections or use adapters. Ensure the complete gas system has been checked for leaks before use.

Prevent entrapment of cryogenic liquid in closed systems not protected with relief device. When moving containers, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport containers. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices. Only transfer lines designed for cryogenic liquids shall be used.

Storage

Do not allow storage temperature to exceed 50°C (122°F). Containers should be stored in a designated area which should be well ventilated, preferably in the open air. Where this is not possible fixed carbon dioxide detectors or permanent forced air ventilation should be considered. Full containers should be stored so that oldest stock is used first. Do not store in a confined space. Store containers in location free from fire risk and away from sources of heat and ignition. Stored containers should be periodically checked for general condition and leakage. Containers should not be stored in conditions likely to encourage corrosion. All vents should be piped to the exterior of the building. Cryogenic containers are equipped with pressure relief devices to control internal pressure. Under normal conditions these containers will periodically vent product. Observe all regulations and local requirements regarding storage of containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide natural or mechanical ventilation to prevent carbon dioxide enriched atmospheres above 1.5% carbon dioxide. Keep self contained breathing apparatus readily available for emergency use.

Personal protective equipment

Respiratory protection:	Not required provided use is in a well ventilated area and/or protected by monitoring equipment. Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in carbon dioxide enriched and oxygen-deficient atmosphere. Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.
Hand protection:	Loose fitting thermal insulated or leather gloves. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection:	Safety glasses recommended when handling pressurised containers. Protect eyes, face and skin from liquid splashes.
Skin and body protection:	Never allow any unprotected part of the body to touch uninsulated pipes or vessels which contain cryogenic fluids. The extremely cold metal will cause the flesh to stick fast and tear when one attempts to withdraw from it. Safety shoes are recommended when handling containers.
Special instructions for protection and hygiene:	Ensure adequate ventilation, especially in confined areas.

Exposure Limit(s)

Carbon dioxide	Time Weighted Average (TWA): EH40 WEL	5,000 ppm	9,150 mg/m ³
Carbon dioxide	Short Term Exposure Limit (STEL): EH40 WEL	15,000 ppm	27,400 mg/m ³
Carbon dioxide	Time Weighted Average (TWA): EU ELV	5,000 ppm	9,000 mg/m ³

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Liquefied gas.
Color:	Colorless.
Odor:	No odor warning properties.
Molecular Weight:	44 g/mol
Relative vapor density:	1.52 (air = 1)
Relative density:	1.03 (water = 1)
Vapor pressure:	57.30 bar (831.04 psia) at 20 °C
Boiling point/range:	-78.5 °C (-109 °F)
Critical temperature:	30 °C (86 °F)
Melting point/range:	-56.6 °C
Water solubility:	2.000 g/l

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.
Materials to avoid: Carbon steel.

11. TOXICOLOGICAL INFORMATION

Acute Health Hazard

Ingestion: No data is available on the product itself.
Inhalation: No data is available on the product itself.
Skin: No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity: Not applicable.
Toxicity to other organisms: Not applicable.

Persistence and degradability

Mobility: No data available.
Bioaccumulation: No data is available on the product itself.

Further information

When discharged in large quantities may contribute to the greenhouse effect.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Return unused product in original container to supplier. Contact supplier if guidance is required.
Contaminated packaging: Return container to supplier.

14. TRANSPORT INFORMATION

ADR

Proper shipping name: CARBON DIOXIDE, REFRIGERATED LIQUID
Class: 2.2
UN/ID No: UN2187
ADR/RID Hazard ID No: 22

IATA

Proper shipping name: CARBON DIOXIDE, REFRIGERATED LIQUID
Class: 2.2
UN/ID No: UN2187

IMDG

Proper shipping name: CARBON DIOXIDE, REFRIGERATED LIQUID
Class: 2.2
UN/ID No: UN2187

RID

Proper shipping name: CARBON DIOXIDE, REFRIGERATED LIQUID
Class: 2.2
UN/ID No: UN2187

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment by a gas tight bulk head. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact CryoService.

15. REGULATORY INFORMATION**Labelling according to EEC Directive**

R-phrase(s): Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 1999/45/EC.
No EC labelling required.

Country	Regulatory List	Notification
USA	TSCA	Included on Inventory
EU	EINECS	Included on Inventory
Canada	DSL	Included on Inventory
Australia	AICS	Included on Inventory
South Korea	ECL	Included on Inventory
China	SEPA	Included on Inventory
Philippines	PICCS	Included on Inventory
Japan	ENCS	Included on Inventory

WGK Identification Number: Not water endangering.

16. OTHER INFORMATION

Ensure all national/local regulations are observed.

Prepared by: CryoService Limited

For additional information, please visit our web site at
<http://www.cryoservice.co.uk>

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws.

Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.