

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

Identification of the substance/preparation:	Carbon dioxide
Chemical formula :	CO <sub>2</sub>
Synonyms :	Carbon dioxide, Carbonic Anhydride, Carbonic Acid Gas, Carbon Anhydride
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

Can cause rapid suffocation.  
Compressed liquefied gas.  
Avoid breathing gas.  
Direct contact with liquid can cause frostbite.  
Self contained breathing apparatus (SCBA) may be required.

### Potential Health Effects

Inhalation:	Concentrations of 10% CO <sub>2</sub> 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.
Ingestion:	Ingestion is not considered a potential route of exposure.
Chronic Health Hazard:	Not applicable.
Aggravated Medical Condition:	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
Nitrogen	204-699-9	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. Seek medical advice.
Skin contact:	Wash frost-bitten areas with plenty of water. Do not remove clothing. Cover wound with sterile dressing. As soon as practical, place the affected area in a warm water bath which has a temperature not exceeding 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:	Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Product is nonflammable and does not support combustion. Move away from container and cool with water from a protected position. If possible, stop flow of product. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out.
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. Evacuate personnel to safe areas. Monitor carbon dioxide and oxygen levels. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Monitor oxygen level. Ventilate the area.
Environmental precautions:	Should not be released into the environment. Do not discharge into any place where its accumulation could be dangerous. Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can 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. 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 cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

#### 7. HANDLING AND STORAGE

##### Handling

Only experienced and properly instructed persons should handle compressed gases. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. 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.

Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. 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. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. 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. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices. Never attempt to lift a cylinder by its valve protection cap or guard. Always use backflow protective device in piping. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Prolonged periods of cold temperature below -30°C (-20°F) should be avoided. Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture.

### Storage

Full containers should be stored so that oldest stock is used first. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in a purpose built compound 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. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Return empty containers in a timely manner.

### Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Engineering measures

Provide natural or mechanical ventilation to prevent carbon dioxide enriched atmospheres above 1.5% carbon dioxide.

### Personal protective equipment

Respiratory protection:

Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in carbon dioxide enriched or oxygen-deficient atmosphere. Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.

Hand protection:

Sturdy work gloves are recommended for handling cylinders. 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.

Skin and body protection:

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

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Form:	Liquefied gas.
Color:	Colorless gas.
Odor:	No odor warning properties.
Molecular Weight:	44.01 g/mol
Relative vapor density:	1.519 (air = 1)
Relative density:	0.82 (water = 1)
Vapor pressure:	57.30 bar (831.04 psia) at 20 °C
Density:	0.0018 g/cm <sup>3</sup> (0.112 lb/ft <sup>3</sup> ) at 21 °C ( 70 °F) Note: (as vapor)
Specific Volume:	0.5456 m <sup>3</sup> /kg (8.74 ft <sup>3</sup> /lb) at 21 °C ( 70 °F)
Boiling point/range:	-88.1 °C ( -127 °F)
Critical temperature:	31.1 °C ( 88 °F)
Melting point/range:	-56.6 °C
Water solubility:	2.000 g/l

**10. STABILITY AND REACTIVITY**

Stability:	Stable under normal conditions.
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**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:	No data is available on the product itself.
Toxicity to other organisms:	No data available.

**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 cylinder to supplier. Contact supplier if guidance is required.
Contaminated packaging:	Return container to supplier.

**14. TRANSPORT INFORMATION****ADR**

Proper shipping name:	CARBON DIOXIDE
Class:	2.2
UN/ID No:	UN1013
ADR/RID Hazard ID No:	20

**IATA**

Proper shipping name: CARBON DIOXIDE  
Class: 2.2  
UN/ID No: UN1013

**IMDG**

Proper shipping name: CARBON DIOXIDE  
Class: 2.2  
UN/ID No: UN1013

**RID**

Proper shipping name: CARBON DIOXIDE  
Class: 2.2  
UN/ID No: UN1013

**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.