Safety data sheet
Carbon dioxide, refrigerated liquid.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Product name
Carbon dioxide, refrigerated liquid.
Trade name
Carbon dioxide liquefied

EC No (from EINECS): 204-696-9
CAS No: 124-38-9
Index-Nr. -
Chemical formula CO_2
REACH Registration number:
Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.

1.2. Relevant identified uses of the substance or mixture and uses advised against
Relevant identified uses
Industrial and professional. Perform risk assessment prior to use.
Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet
Company identification
BOC, Priestley Road, Worsley, Manchester M28 2UT
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 0800 111 333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Press. Gas (Refrigerated liquefied gas) - Contains refrigerated gas; may cause cryogenic burns or injury.

Classification acc. to Directive 67/548/EEC & 1999/45/EC
Not classified as hazardous to health.
Asphyxiant in high concentrations.
Risk advice to man and the environment
Refrigerated liquefied gas. Contact with product may cause cold burns or frostbite.

2.2. Label elements
- Labelling Pictograms

- Signal word
Warning

- Hazard Statements

H281	Contains refrigerated gas; may cause cryogenic burns or injury.
EIGA-As	Asphyxiant in high concentrations.

- Precautionary Statements

Precautionary Statement Prevention

P282	Wear cold insulating gloves/face shield/eye protection.

Precautionary Statement Response

P336+P315	Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

Precautionary Statement Storage

P403	Store in a well-ventilated place.

Precautionary Statement Disposal
None.

2.3. Other hazards
None.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances
Carbon dioxide, refrigerated liquid.
CAS No: 124-38-9
Index-Nr.: -
EC No (from EINECS): 204-696-9
REACH Registration number:
Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.
Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures
Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures
First Aid General Information:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Inhalation:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Skin / Eye:
In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. Immediately flush eyes thoroughly with water for at least 15 minutes.
First Aid Ingestion:
Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations of CO_2 cause increased respiration and headache.

4.3. Indication of any immediate medical attention and special treatment needed
None.

SECTION 5: Fire fighting measures

5.1. Extinguishing media

Suitable extinguishing media
All known extinguishants can be used.

5.2. Special hazards arising from the substance or mixture
Specific hazards
Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products
None.

5.3. Advice for fire-fighters
Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.
Special protective equipment for fire-fighters
In confined space use self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Use protective clothing.

6.2. Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up
Ventilate area. Liquid spillages can cause embrittlement of structural materials.

6.4. Reference to other sections
See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Check regularly tightness of the plant. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Do not smoke while handling product. Only experienced and properly instructed persons should handle gases under pressure. Protect cylinders from physical damage; do not drag, roll, slide or drop. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Ensure the complete gas system has been (or is regularly) checked for leaks before use. 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 valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. Never attempt to transfer gases from one cylinder/container to another. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Potential production of solid CO_2 particles must be ruled out. In order to rule out potential electrostatic discharge production the system must be adequately grounded. Depressurisation of liquid CO_2 below approximately 5 bar can create solid CO_2 which may block protective devices, pipeworkand create dry-ice within containers.

7.2. Conditions for safe storage, including any incompatibilities
Secure cylinders to prevent them from falling. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure limit value

Value type	value	Note
Great Britain - STEL	15.000 ppm	EH 40/07
Great Britain - LTEL	5.000 ppm	EH 40/07

8.2. Exposure controls
Appropriate engineering controls
Product to be handled in a closed system. Gas detectors should be used when toxic quantities may be released. Keep concentrations well below occupational exposure limits. Oxygen detectors should be used when asphixiating gases may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation.
Personal protective equipment
Eye and face protection
Safety eyewear, goggles or face shield to EN166 should be used to avoid exposure to liquid splashes.
Skin protection
Hand protection
Advice:
EN 511 Protective gloves against cold.
Body protection
Protect eyes, face and skin from contact with product.
Other protection
Wear cold insulating gloves.
Respiratory protection
Not required
Thermal hazards
If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.
Environmental Exposure Controls
Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations

for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
General information
Appearance/Colour: Colourless liquid.
Odour: No odour warning properties.
Melting point: -56,6 °C
Boiling point: -78,5 °C
Flash point: Not applicable for gases and gas mixtures.
Flammability range: Non flammable.
Vapour Pressure 20 °C: 57,3 bar
Relative density, gas: 1,52
Solubility in water: 2000 mg/l
Partition coefficient: n-octanol/water: 0,83 logPow
Autoignition temperature: Not applicable.
Explosive properties:
Explosive acc. EU legislation: Not explosive.
Explosive acc. transp. reg.: Not explosive.
Oxidising properties: Not applicable.
Molecular weight: 44 g/mol
Sublimation point: -78,5 °C

Critical temperature: 31 °C
Relative density, liquid: 1,03

9.2. Other information
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
Unreactive under normal conditions.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
None.

10.4. Conditions to avoid
None.

10.5. Incompatible materials
Cryogenic liquids can cause embrittlement of some metals and alter the physical properties of other materials. For material compatibility see latest version of ISO-11114.

10.6. Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
General
In high concentrations may cause rapid circulatory insufficiency even at normal levels of oxygen concentration . Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and even death.

SECTION 12: Ecological information

12.1. Toxicity
Can cause frost damage to vegetation.

12.2. Persistence and degradability
Not applicable.

12.3. Bioaccumulative potential
Not applicable.

12.4. Mobility in soil
The substance is a gas, not applicable.

12.5. Results of PBT and vPvB assessment
Not classified as PBT or vPvB.

12.6. Other adverse effects
Can cause frost damage to vegetation.
Global Warming Potential GWP
When discharged in large quantities may contribute to the greenhouse effect.
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SECTION 13: Disposal considerations

13.1. Waste treatment methods
Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place. Discharge to atmosphere in large quantities should be avoided. Contact supplier if guidance is required.
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SECTION 14: Transport information

ADR/RID

14.1. UN number
2187

14.2. UN proper shipping name
Carbon dioxide, refrigerated, liquid

14.3. Transport hazard class(es)
Class: 2
Classification Code: 3A
Labels: 2.2
Hazard number: 22
Emergency Action Code: 2T

14.4. Packing group (Packing Instruction)
P203

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

IMDG

14.1. UN number
2187

14.2. UN proper shipping name
Carbon dioxide, refrigerated, liquid

14.3. Transport hazard class(es)
Class: 2.2
Labels: 2.2
EmS: FC; SV

14.4. Packing group (Packing Instruction)
P203

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

IATA

14.1. UN number
2187

14.2. UN proper shipping name
Carbon dioxide, refrigerated, liquid

14.3. Transport hazard class(es)
Class: 2.2
Labels: 2.2

14.4. Packing group (Packing Instruction)
P202

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. 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. Before transporting product containers ensure that they are firmly secured. Ensure adequate ventilation. Ensure compliance with applicable regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Seveso Directive 96/82/EC: Not covered.

15.2. Chemical safety assessment
A CSA does not need to be carried out for this product.

SECTION 16: Other information

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Advice
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. Details given in this document are believed to be correct at the time of going to press.

Further information
Note:
When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line.
As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

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