

## Safety data sheet

### Carbon dioxide, refrigerated liquid.

Creation date : 27.01.2005  
Revision date : 01.04.2011

Version : 1.3

IE / E

SDS No. : 9451  
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#### 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<sub>2</sub>

###### 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, PO Box 1201, Bluebell, Dublin

**E-Mail Address** ReachSDS@boc.com

##### 1.4. Emergency telephone number

**Emergency phone numbers (24h):** 1850 333 435

#### 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<sub>2</sub> 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

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#### 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 contaminants 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<sub>2</sub> particles must be ruled out. In order to rule out potential electrostatic discharge production the system must be adequately grounded. Depressurisation of liquid CO<sub>2</sub> below approximately 5 bar can create solid CO<sub>2</sub> which may block protective devices, pipework and 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 asphyxiating 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

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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

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### 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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