

Safety data sheet Carbon monoxide, compressed.

Creation date : 28.01.2005
Revision date : 01.06.2011

Version : 1.2

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

1.1. Product identifier

Product name

Carbon monoxide, compressed.

EC No (from EINECS): 211-128-3

CAS No: 630-08-0

Index-Nr. 006-001-00-2

Chemical formula CO

REACH Registration number:

01-2119480165-39

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. Substance registered as transported isolated intermediate according to REACH article 18(4). Strictly controlled conditions shall be applied.

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 (Compressed gas) - Contains gas under pressure; may explode if heated.

Flam. Gas 1 - Extremely flammable gas.

Repr. 1A - May damage the unborn child.

Acute Tox. 3 - Toxic if inhaled.

STOT RE 1 - Causes damage to organs through prolonged or repeated exposure.

Classification acc. to Directive 67/548/EEC & 1999/45/EC

F+; R12 | Repr. Cat.1; R61 | T; R23, R48/23

May cause harm to the unborn child.

Toxic by inhalation.

Toxic: danger of serious damage to health by prolonged exposure through inhalation.

Extremely flammable.

Risk advice to man and the environment

Compressed gas.

2.2. Label elements

- Labelling Pictograms



- Signal word

Danger

- Hazard Statements

H280	Contains gas under pressure; may explode if heated.
H220	Extremely flammable gas.
H360	May damage fertility or the unborn child.
H331	Toxic if inhaled.
H372	Causes damage to organs through prolonged or repeated exposure.

- Precautionary Statements

Precautionary Statement Prevention

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe gas, vapours.

Precautionary Statement Response

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice/attention.
P308 + P313	IF exposed or concerned: Get medical advice/attention.

Precautionary Statement Storage

P403	Store in a well-ventilated place.
P405	Store locked up.

Precautionary Statement Disposal

None.

2.3. Other hazards

None.

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SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances

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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:

Adverse effects not expected from this product.

First Aid Ingestion:

Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms may include dizziness, headache, nausea and loss of co-ordination. Delayed adverse effects possible.

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance. Recommendations to physicians: Provide oxygen.

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 firefighters

Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Prevent water

used in emergency cases from entering sewers and drainage systems. Extinguish any other fire.

Special protective equipment for fire fighters

Use self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Eliminate ignition sources. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Consider the risk of potentially explosive atmospheres. Monitor concentration of released product.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. 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. Keep away from ignition sources (including static discharges). Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Avoid exposure, obtain special instructions before use. Avoid suckback of water, acid and alkalis. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment. Consider the use of only non-sparking tools. 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

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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. Installation of a cross purge assembly between the cylinder and the regulator is recommended. Take precautionary measures against static discharges

7.2. Conditions for safe storage, including any incompatibilities

Secure cylinders to prevent them from falling. Segregate from oxidant gases and other oxidants in store. 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. All electrical equipment in the storage areas should be compatible with the risk of potentially explosive atmosphere.

7.3. Specific end use(s)

Formulation of mixtures with gas in pressure receptacles, Transferring gas or liquid., Manufacture and distribution of the substance., Use as a fuel source., Use as a laboratory reagent., Use as feedstock in chemical processes, use as Intermediate (transported, on-site isolated), Use for electronic component manufacture, Use of gas to manufacture pharmaceutical products., Using gas alone or in mixtures for the calibration of analysis equipment., Using gas as a monomer in polymer production., Using gas for metal treatment. Control of polymerisation processes.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limit value

Value type	value	Note
IOELV 8 hrs (EU)	20 ppm	IOELV 8 hrs (EU)
IOELV 15 min (EU)	100 ppm	IOELV 15 min (EU)

Derived No Effect Levels

Type	Exposure	Value	Population	Effects
DNEL	Short term Inhalation	117 mg/m ³	Workers	Systemic
DNEL	Short term Inhalation	117 mg/m ³	Workers	Local
DNEL	Long term Inhalation	23 mg/m ³	Workers	Systemic
DNEL	Long term Inhalation	23 mg/m ³	Workers	Local

The substance is a gas and extremely unlikely to reside in the aquatic compartment.
PNEC not available

8.2. Exposure controls

Appropriate engineering controls

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Gas detectors should be used when toxic quantities may be released. Keep concentrations well below occupational exposure limits. Gas detectors should be used when quantities of flammable gases/vapours may be released. Keep concentrations well below lower explosion limits. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Use only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation. Product to be handled in a closed system and under strictly controlled conditions.

Personal protective equipment

Eye and face protection

Wear eye protection to EN 166 when using gases.

Skin protection

Hand protection

Advice: Wear working gloves and safety shoes while handling gas cylinders.

Other protection

Wear flame resistant/retardant clothing.

Take precautionary measures against static discharges.

Wear working gloves and safety shoes while handling gas cylinders.

ISO 20345 Safety footwear

Respiratory protection

Keep self contained breathing apparatus readily available for emergency use. Use SCBA in the event of high concentrations. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. When allowed by a risk assessment a supplied air respirator may be used. Respiratory Protective Equipment (RPE) is recommended when conducting operations according to exposure scenarios contained in the extended safety data sheet. Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.

Guideline:

EN 136: Respiratory protective devices. Full face masks. Requirements, testing, marking.

Thermal hazards

Not required

Environmental Exposure Controls

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

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General information

Appearance/Colour: Colourless gas.

Odour: None.

Odour threshold:

Odour threshold is subjective and inadequate to warn for over exposure.

Melting point: -205 °C

Boiling point: -192 °C

Flash point: Not applicable for gases and gas mixtures.

Evaporation rate:

Not applicable for gases and gas mixtures.

Flammability range: 10,9 %(V) - 76 %(V)

Vapour Pressure 20 °C: Not applicable.

Relative density, gas: 1

Solubility in water: 30 mg/l

Partition coefficient: n-octanol/water: 1,78 logPow

Autoignition temperature: 620 °C

Explosive properties:

Explosive acc. EU legislation: Not explosive.

Explosive acc. transp. reg.: Not explosive.

Oxidising properties: Not applicable.

Molecular weight: 28 g/mol

Critical temperature: -140 °C

Relative density, liquid: 0,79

9.2. Other information

None.

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

Can form potential explosive atmosphere in air., May react violently with oxidants.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

10.5. Incompatible materials

Air, Oxidiser. 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

Acute oral toxicity

Not applicable.

Acute inhalation toxicity

Value: LC50

Species: Rat

Exposure time: 4 h

Value in non-standard unit: 1300 ppm

Value: LC50

Species: Rat

Exposure time: 1 h

Value in non-standard unit: 3760 ppm

Acute dermal toxicity

Not applicable.

Skin irritation

Not applicable.

Eye irritation

Not applicable.

Sensitization

This substance is not classified as a sensitiser.

Repeated dose toxicity

Species: Rat

Route of application: Inhalation

Exposure time: 1 hour/day for 28 consecutive days.

Doses: Low dose

Value type: NOEC

Value: 100 - 900 ppm

No known effects from this product.

Species: Rat

Route of application: Inhalation

Exposure time: 1 hour/day for 28 consecutive days.

Doses: Mid dose

Value type: LOAEC

Value: 100 - 900 ppm

Haematological changes, myocardial fibrosis, increased heart weights, degenerative changes in the testes and secondary changes in the epididymides at the mid- and high dose.

Species: Rat

Route of application: Inhalation

Exposure time: 72 weeks (20hr/day, 5 days/week)

Value type: LOAEC

Value: 200 ppm

Increase in heart weight.

Species: Beagle (dog)

Exposure time: 1 hour/day for 28 consecutive days.

Doses: High dose

Value type: NOEC

Value: 150 - 350 ppm

No known effects from this product.

Assessment mutagenicity

Memo: There is no evidence of mutagenic potential.

Assessment carcinogenicity

No evidence of carcinogenic effects.

Toxicity to reproduction/fertility

Species: Mouse

Route of application: Inhalation

Value type: NOAEC (embryotoxicity)

Exposure: Gestation days 7 to 18

Concentration: 0, 65, 125, 250 and 500 ppm.

Results: 65ppm (nominal)

A NOAEC was set at 65 ppm as at 125 ppm a reduction in

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foetal bodyweight was observed.

Species: Mouse
Route of application: Inhalation
Value type: NOAEC (maternal toxicity)
Exposure: Gestation days 7 to 18
Concentration: 0, 65, 125, 250 and 500 ppm.
Results: 500ppm (nominal)
As no signs of toxicity were reported, the highest dose was considered the NOAEC.

Species: Mouse
Route of application: Inhalation
Value type: LOAEC (COHb levels in the maternal and placental blood)
Exposure: Gestation days 8 to 18
Concentration: 0, 65, 125, 250 and 500 ppm.
Results: 654ppm (nominal)
No NOAEC could be obtained, therefore the lowest dose tested, 65 ppm, was considered the LOAEC, based on the amount of COHb detected.

Species: Mouse
Route of application: Inhalation
Value type: NOAEC (maternal toxicity)
Exposure: 23 hours/day. Gestation days 8 to 18
Concentration: 65, 125, 250 and 500 ppm.
Results: 500ppm (nominal)
As no signs of toxicity were reported, the highest dose was considered the NOAEC

Species: Mouse
Route of application: Inhalation
Value type: NOAEC (embryotoxicity)
Exposure: 23 hours/day. Gestation days 8 to 18
Concentration: 65, 125, 250 and 500 ppm.
No NOAEC can be determined as significant increases in both gross and skeletal malformations were observed at the lowest dose tested.

Species: Mouse
Route of application: Inhalation
Value type: LOAEC (embryotoxicity)
Exposure: 23 hours/day. Gestation days 8 to 18
Concentration: 65, 125, 250 and 500 ppm.
Results: 65ppm (nominal)
Significant increases in both gross and skeletal malformations were observed at the lowest dose tested.

Assessment toxicity to reproduction

Classified as reproductive toxicant.

Experiences with human exposure

Carbon monoxide binds reversibly to haemoglobin (Hb) to form carboxyhaemoglobin (CoHb), reducing the capacity of the blood to transport oxygen.

SECTION 12: Ecological information

12.1. Toxicity

Acute and prolonged toxicity fish

As the substance is a gas which is lighter than air it is highly unlikely to partition into water.

Acute toxicity aquatic invertebrates

As the substance is a gas which is lighter than air it is highly unlikely to partition into water.

Toxicity aquatic plants

As the substance is a gas which is lighter than air it is highly unlikely to partition into water.

Toxicity microorganisms

As the substance is a gas which is lighter than air it is highly unlikely to partition into water., Accumulation in organisms is not to be expected.

Chronic toxicity aquatic invertebrates

As the substance is a gas which is lighter than air it is highly unlikely to partition into water.

Toxicity to soil dwelling organisms

The substance is a gas, not applicable.

Toxicity terrestrial plants

Study not necessary due to exposure considerations.

Toxicity other terrestrial non-mammals

Study not necessary due to exposure considerations.

12.2. Persistence and degradability

Will not undergo hydrolysis., Not readily biodegradable.
Inorganic compound.

Stability in water

As the substance is a gas which is lighter than air it is highly unlikely to partition into water., Not known, but considered to have low solubility.

Stability in soil

As the substance is a gas which is lighter than air it is highly unlikely to partition into water., Not known, but considered to have low solubility.

Biodegradation

Not readily biodegradable. Inorganic compound.

12.3. Bioaccumulative potential

Because of the low log Kow, accumulation in organisms is not to be expected.

Bioaccumulation

The substance has no potential for bioaccumulation.

12.4. Mobility in soil

Because of its high volatility, the product is unlikely to cause ground or water pollution.

Transport between environment compartments

As the substance is a gas which is lighter than air it is highly unlikely to partition into water.

12.5. Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6. Other adverse effects

Not applicable.

Global Warming Potential GWP

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

1,9

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Must not be discharged to atmosphere. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a

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suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Refer to the code of practice of EIGA (Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods.

Gases in pressure containers (including halons) containing dangerous substances.

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SECTION 14: Transport information

ADR/RID

14.1. UN number

1016

14.2. UN proper shipping name

Carbon monoxide, compressed

14.3. Transport hazard class(es)

Class: 2

Classification Code: 1TF

Labels: 2.3, 2.1

Hazard number: 263

Emergency Action Code: 2SE

Tunnel Restriction: (B/D)

14.4. Packing group (Packing Instruction)

P200

14.5. Environmental hazards

None.

14.6. Special precautions for user

None.

IMDG

14.1. UN number

1016

14.2. UN proper shipping name

Carbon monoxide, compressed

14.3. Transport hazard class(es)

Class: 2.3

Labels: 2.3, 2.1

EmS: F-D, S-U

14.4. Packing group (Packing Instruction)

P200

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

1016

14.2. UN proper shipping name

Carbon monoxide, compressed

14.3. Transport hazard class(es)

Class: 2.3

Labels: 2.3, 2.1

14.4. Packing group (Packing Instruction)

P200

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 that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. 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: Covered

15.2. Chemical safety assessment

CSA has been carried out.

SECTION 16: Other information

Ensure all national/local regulations are observed. Ensure operators understand the flammability hazard. Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard. 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

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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).

End of document