

Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005
Date of issue: 8/6/2021 Revision date: 8/6/2021 Supersedes version of: 4/30/2014 Version: 2.4

Warning



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

1.1. Product identifier

Trade name : Carbon dioxide (refrigerated), Carbon dioxide for foodstuff (refrigerated), Carbon dioxide refrigerant R744
SDS no : AWO005
Other means of identification : Carbon dioxide (refrigerated)
CAS No : 124-38-9
EC no : 204-696-9
EC index no : ---
Registration-No. : Listed in Annex IV / V REACH, exempted from registration.
Chemical formula : CO₂

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.
Test gas/Calibration gas.
Laboratory use.
Purging.
Shield gas for welding processes.
Use for manufacture of electronic/photovoltaic components.
Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet

Oy Woikoski Ab
Virransalmentie 2023
52920 Voikoski Finland
Tel. +358 15 7700 700
info@woikoski.fi
www.woikoski.fi

1.4. Emergency telephone number

No additional information available

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards Gases under pressure : Refrigerated liquefied gas H281

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) : Warning
Hazard statements (CLP) : H281 - _H_281_EU.



Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

Precautionary statements (CLP)

- Prevention : P282 - _P_282_EU.
- Storage : P403 - _P_403_EU.

2.3. Other hazards

Asphyxiant in high concentrations.

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Carbon dioxide (refrigerated)	CAS No: 124-38-9 EC no: 204-696-9 EC index no: --- Registration-No.: *1	100	Refrigerated liquefied gas, H281

Contains no other components or impurities which will influence the classification of the product.

*1: Listed in Annex IV / V REACH, exempted from registration.

*3: Registration not required: Substance manufactured or imported < 1t/y.

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- 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.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- 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 CO2 cause increased respiration and headache.

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

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

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.

Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

5.3. Advice for firefighters

Specific methods

- : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
- Exposure to fire may cause containers to rupture/explode.
- If possible, stop flow of product.
- Use water spray or fog to knock down fire fumes if possible.

Special protective equipment for fire fighters

- : Use self-contained breathing apparatus.
- Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.
- Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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

6.2. Environmental precautions

- Try to stop release.

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

Safe use of the product

- : The substance must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.

Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.

7.2. Conditions for safe storage, including any incompatibilities

- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps should be in place.
- Containers should be stored in the vertical position and properly secured to prevent toppling.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated 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

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- Provide adequate general and local exhaust ventilation.
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Oxygen detectors should be used when asphyxiating gases may be released.
- Consider work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

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:

- Protect eyes, face and skin from liquid splashes.
- PPE compliant to the recommended EN/ISO standards should be selected.
- Eye/face protection
 - : Wear safety glasses with side shields.
 - Wear goggles and a face shield when transfilling or breaking transfer connections.
 - Standard EN 166 - Personal eye-protection.
- Skin protection
 - Hand protection
 - : Wear working gloves when handling gas containers.
 - Standard EN 388 - Protective gloves against mechanical risk.
 - Other
 - : Wear safety shoes while handling containers.
 - Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Respiratory protection
 - : Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
 - Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
- Thermal hazards
 - : Wear cold insulating gloves when transfilling or breaking transfer connections.
 - Standard EN 511 - Cold insulating gloves.

8.2.3. Environmental exposure controls

None necessary.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
- Physical state at 20°C / 101.3kPa	: Gas
- Colour	: Colourless.
Odour	: No odour warning properties. Odour threshold is subjective and inadequate to warn for overexposure.
pH	: Not applicable.
Melting point / Freezing point	: -78.5 °C -56.6 °C
Boiling point	: -78.5 °C
Flash point	: Not applicable for gases and gas-mixtures.
Flammability	: Not available
Explosive limits	: Non flammable.
LEL	: Not available
UEL	: Not available
Vapour pressure [20°C]	: 5730 kPa
Vapour pressure [50°C]	: Not available
Density	: Not applicable
Vapour density	: Not available
Relative density, liquid (water=1)	: 0.82
Relative density, gas (air=1)	: 1.52
Water solubility	: 2000 mg/l Completely soluble.
Partition coefficient n-octanol/water (Log Kow)	: 0.83
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: Not available
Viscosity, kinematic	: Not applicable.
Particle characteristics	: Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	: Not applicable.
Oxidising properties	: None.
	:
Critical temperature [°C]	: 31 °C

9.2.2. Other safety characteristics

Molar mass	: 44 g/mol
Evaporation rate	: Not applicable for gases and gas-mixtures.
Gas group	: Refrigerated liquefied gas
Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.



Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

None.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

None.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity	: In high concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness.
Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: No known effects from this product.
STOT-single exposure	: No known effects from this product.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Assessment	: No ecological damage caused by this product.
EC50 48h - Daphnia magna	: No data available.
EC50 72h Algae	: No data available.
LC50-96 h - fish	: No data available.

12.2. Persistence and degradability

Assessment	: No ecological damage caused by this product.
------------	------------------------------------------------

12.3. Bioaccumulative potential

Assessment	: No ecological damage caused by this product.
------------	------------------------------------------------

12.4. Mobility in soil

Assessment	: No ecological damage caused by this product.
------------	------------------------------------------------

12.5. Results of PBT and vPvB assessment

Assessment	: Not classified as PBT or vPvB.
------------	----------------------------------

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

Other adverse effects	: Can cause frost damage to vegetation.
Effect on the ozone layer	: None.
Global warming potential [CO ₂ =1]	: 1



Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Consult supplier for specific recommendations.
May be vented to atmosphere in a well ventilated place.
Discharge to atmosphere in large quantities should be avoided.
Do not discharge into any place where its accumulation could be dangerous.
List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.

13.2. Additional information

None.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 2187

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : CARBON DIOXIDE, REFRIGERATED LIQUID

14.3. Transport hazard class(es)

Labelling :
Transport by road/rail (ADR/RID)
Class : 2
Classification code : 3A
Hazard identification number : 22
Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable
Transport by air (ICAO-TI / IATA-DGR) : Not applicable
Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Special transport precautions : 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 there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.



Safety Data Sheet

Carbon dioxide (refrigerated)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Reference number: AWO005

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU-Regulations

Restrictions on use : None.
Other information, restriction and prohibition regulations : Ensure all national/local regulations are observed.
Seveso directive 96/82/EC : Not covered.

National regulations

No additional information available

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.
Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.
Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of H- and EUH-phrases	
H281	_H_281_EU
Refrigerated liquefied gas	Gases under pressure : Refrigerated liquefied gas

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
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.

End of document