

**Carbon dioxide (refrigerated)**

SDS reference: 018B

Revision date: 01/06/2016

Supersedes: 20/11/2015

Version: 5.0

**Warning****SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Carbon dioxide (refrigerated)  
SDS no : 018B  
Chemical description : 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 : CO<sub>2</sub>

**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  
Purge gas, diluting gas, inerting gas  
Purging  
Laboratory use  
Use for manufacture of electronic/photovoltaic components  
Shield gas for welding processes  
Contact supplier for more information on uses

**1.3. Details of the supplier of the safety data sheet**

Company identification : SOL Kohlensäure GmbH & Co. KG  
Brohltalstraße, 26  
D-56659 Burgbrohl Deutschland  
02636 510936  
sks.solgroup.com

**1.4. Emergency telephone number**

Emergency telephone number : 0800 2626 777

**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**

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

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) :

Warning

Hazard statements (CLP) :

H281 - Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary statements (CLP)

- Prevention : P282 - Wear cold insulating gloves, face shield, eye protection
- Response : P336+P315 - Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice / attention
- Storage : P403 - Store in a well-ventilated place

### 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	Press. Gas (Ref. Liq.), 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.

\*2: Registration deadline not expired.

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

Full text of H-statements see section 16.

**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

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: 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: 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

### 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  
If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire  
Move containers away from the fire area if this can be done without risk

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 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask  
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters

## 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  
Act in accordance with local emergency plan  
Stay upwind

### 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

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: See also sections 8 and 13

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- Safe use of the product : The product 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  
Do not breathe gas  
Avoid release of product into atmosphere.
- 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 them from falling over  
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

Carbon dioxide (refrigerated) (124-38-9)		
OEL : Occupational Exposure Limits		
Germany	TWA (DE) OEL 8h [mg/m <sup>3</sup> ] TRGS 900	9100 mg/m <sup>3</sup>
	TWA (DE) OEL 8h [ppm] TRGS 900	5000 ppm
	Peak exposure limitation factor (DE) OEL TRGS 900	2

DNEL (Derived-No Effect Level) : No data available.

PNEC (Predicted No-Effect Concentration) : No data available.

#### 8.2. Exposure controls

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**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 the use of a 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 - specifications

## • 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

- : Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres
- Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask

## • 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

: Odour threshold is subjective and inadequate to warn of overexposure.

pH value

: Not applicable.

Molar mass

: 44 g/mol

Melting point

: 78,5 °C

Boiling point

: -56,6 °C (s)

Flash point

: Not applicable for gases and gas mixtures.

Critical temperature [°C]

: 30 °C

Evaporation rate (ether=1)

: Not applicable for gases and gas mixtures.

Flammability range

: Non flammable.

Vapour pressure [20°C]

: 57,3 bar(a)

Vapour pressure [50°C]

: Not applicable.

Relative density, gas (air=1)

: 1,52

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Relative density, liquid (water=1)	: 0,82
Solubility in water	: 2000 mg/l Completely soluble.
Partition coefficient n-octanol/water [log Kow]	: 0,83
Auto-ignition temperature	: Not applicable.
Viscosity [20°C]	: Not applicable.
Explosive Properties	: Not applicable
Oxidising Properties	: None

**9.2. Other information**

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

**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 toxicological effects**

<b>Acute toxicity</b>	: In high concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness Unlike simple asphyxiants, carbon dioxide has the ability to cause death even when normal oxygen levels (20-21%) are maintained. 5% CO <sub>2</sub> has been found to act synergistically to increase the toxicity of certain other gases (CO, NO <sub>2</sub> ). CO <sub>2</sub> has been shown to enhance the production of carboxy- or met-hemoglobin by these gases possibly due to carbon dioxide's stimulatory effects on the respiratory and circulatory systems
<b>Skin corrosion/irritation</b>	: No known effects from this product
<b>Serious eye damage/irritation</b>	: No known effects from this product
<b>Respiratory or skin sensitisation</b>	: No known effects from this product
<b>Germ cell mutagenicity</b>	: No known effects from this product
<b>Carcinogenicity</b>	: No known effects from this product
<b>Toxic for reproduction : Fertility</b>	: No known effects from this product
<b>Toxic for reproduction : unborn child</b>	: No known effects from this product
<b>STOT-single exposure</b>	: No known effects from this product
<b>STOT-repeated exposure</b>	: No known effects from this product
<b>Aspiration hazard</b>	: Not applicable for gases and gas mixtures

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**SECTION 12: Ecological information**

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**12.1. Toxicity**

Assessment : No ecological damage caused by this product.

EC50 48h - Daphnia magna [mg/l] : No data available.  
EC50 72h - Algae [mg/l] : No data available.  
LC50 96 h - Fish [mg/l] : 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. Other adverse effects**: Can cause frost damage to vegetation.  
Effect on the ozone layer : None  
Global warming potential [CO<sub>2</sub>=1] : 1  
Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect  
Contains greenhouse gas(es)

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**SECTION 13: Disposal considerations**

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**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  
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at  
<http://www.eiga.org> for more guidance on suitable disposal methods

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

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**SECTION 14: Transport information**

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**14.1. UN number**

UN-No. : 2187

**14.2. UN proper shipping name**

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

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Transport by air (ICAO-TI / IATA-DGR) : CARBON DIOXIDE, REFRIGERATED LIQUID

Transport by sea (IMDG) : CARBON DIOXIDE, REFRIGERATED LIQUID

**14.3. Transport hazard class(es)**

Labelling :



2.2 : Non-flammable, non-toxic gases

**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**Transport by air (ICAO-TI / IATA-DGR)**

Class / Div. (Sub. risk(s)) : 2.2

**Transport by sea (IMDG)**Class / Div. (Sub. risk(s)) : 2.2  
Emergency Schedule (EmS) - Fire : F-C  
Emergency Schedule (EmS) - Spillage : S-V**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)**

Transport by road/rail (ADR/RID) : P203

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 202

Cargo Aircraft only : 202

Transport by sea (IMDG) : P203



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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.

### 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: 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  
Seveso directive : 2012/18/EU (Seveso III) : Not covered

#### National regulations

National legislation : Ensure all national/local regulations are observed.  
Water hazard class (WGK) : nwg - Non-hazardous to water  
Kenn-Nr. : 256

### 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 2015/830.  
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-statements

Press. Gas (Ref. Liq.)	Gases under pressure : Refrigerated liquefied gas
H281	Contains refrigerated gas; may cause cryogenic burns or injury

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

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