

### Warning



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

### 1.1. Product identifier

Trade name : Carbon dioxide (refrigerated)  
SDS no : EIGA018B-ALBNL  
Other means of identification : Carbon dioxide (refrigerated)  
CAS-No. : 124-38-9  
EC-No. : 204-696-9  
EC Index-No. : ---

REACH 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 : Extinguishing agent.  
Industrial and professional uses. Perform risk assessment prior to use.  
Test gas/Calibration gas.  
Shield gas for welding processes.  
Use for manufacture of electronic/photovoltaic components.  
Purge gas, diluting gas, inerting gas.  
Use as a biocide.

Uses advised against : Consumer use.  
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

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

#### THE NETHERLANDS:

AIR LIQUIDE BV  
De Witbogt 1  
5652 AG Eindhoven  
the Netherlands-Nederland

#### BELGIUM:

L'AIR LIQUIDE BELGE S.A./N.V.  
Avenue de Bourget / Bourgetlaan 44  
1130 Bruxelles-Brussel  
Belgium-Belgique-België

#### LUXEMBURG:

L'AIR LIQUIDE LUXEMBOURG S.A.  
ZONE P.E.D.-B.P.20  
L-4801 RODANGE Luxemburg

[infosafetydatasheet.albv@airliquide.com](mailto:infosafetydatasheet.albv@airliquide.com)  
[www.airliquide-benelux.com](http://www.airliquide-benelux.com)



### 2.3. Other hazards

Asphyxiant in high concentrations.  
In high concentrations CO<sub>2</sub> causes rapid circulatory insufficiency even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and death.  
The substance/mixture has no endocrine disrupting properties.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

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.: --- REACH 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.

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

### 3.2. Mixtures

Not established.

## 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. Perform cardiopulmonary resuscitation 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 CO<sub>2</sub> cause increased respiration and headache.  
See section 11.

### 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.  
Product does not burn, use fire control measures appropriate for the surrounding fire.
- 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. 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	: In confined space 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**

For non-emergency personnel	: Act in accordance with local emergency plan. Try to stop release. Evacuate area. Ensure adequate air ventilation. Use protective clothing. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Stay upwind. See section 8 of the SDS for more information on personal protective equipment
For emergency responders	: Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Oxygen detectors should be used when asphyxiating gases may be released. See section 5.3 of the SDS for more information.

### **6.2. Environmental precautions**

Try to stop release.  
Liquid spillages can cause embrittlement of structural materials.

### **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

Safe use of the product

- : Do not breathe gas.
- Avoid release of product into work area.
- 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.
- 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.

Safe handling of the gas receptacle

- 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.
- Be aware of the risk of formation of static electricity with the use of CO<sub>2</sub> extinguishers. Do not use them in places where a flammable atmosphere may be present.
- : Protect containers from physical damage; do not drag, roll, slide or drop.
- Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- 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.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- 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.
- Do not remove or deface labels provided by the supplier for the identification of the content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

#### 7.2. Conditions for safe storage, including any incompatibilities

For more guidance on the safe storage of refrigerated CO<sub>2</sub>, refer to EIGA Doc.66 "Refrigerated CO<sub>2</sub> storage at users' premises", downloadable at <http://www.eiga.eu> and consult your supplier.

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)	
<b>EU - Indicative Occupational Exposure Limit (IOEL)</b>	
Local name	Carbon dioxide
IOEL TWA	9000 mg/m <sup>3</sup>
IOEL TWA [ppm]	5000 ppm
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Carbone (dioxyde de) # Koolstofdioxide
OEL TWA	9131 mg/m <sup>3</sup>
OEL TWA [ppm]	5000 ppm
OEL STEL	54784 mg/m <sup>3</sup>
OEL STEL [ppm]	30000 ppm
Remark	A: la mention "A" signifie que l'agent libère un gaz ou une vapeur qui n'ont en eux-mêmes aucun effet physiologique mais peuvent diminuer le taux d'oxygène dans l'air. Lorsque le taux d'oxygène descend en dessous de 17-18 % (vol/vol) le manque d'oxygène provoque des suffocations qu'aucun symptôme préalable n'annonce. # A: de vermelding "A" betekent dat dit agens gas of damp vrijgeeft dat of die op zich geen fysiologische werking heeft, maar het zuurstofgehalte in de lucht verlaagt. Wanneer het zuurstofgehalte daalt onder de 17-18 % (vol/vol), veroorzaakt het zuurstoftekort verstikking, die zich manifesteert zonder dat er een waarschuwing aan voorafgaat.
Regulatory reference	Koninklijk besluit/Arrêté royal 19/11/2020
<b>Luxembourg - Occupational Exposure Limits</b>	
Local name	Dioxyde de carbone
OEL TWA	9000 mg/m <sup>3</sup>
OEL TWA [ppm]	5000 ppm
Regulatory reference	Mémorial A N° 684 de 2018 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Kooldioxide
TGG-8u (OEL TWA)	9000 mg/m <sup>3</sup>
Regulatory reference	Arbeidsomstandighedenregeling 2021

DNEL (Derived-No Effect Level) : None available.

PNEC (Predicted No-Effect Concentration) : None 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 the use of a work permit system e.g. for maintenance activities.  
CO2 detectors should be used when CO2 may be released.

#### 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:  
PPE compliant to the recommended EN/ISO standards should be selected.
- Eye/face protection : 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, performance level 1 or higher.  
Wear cold insulating gloves when transfilling or breaking transfer connections.  
Standard EN 511 - Cold insulating gloves.
    - 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.  
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
  - Thermal hazards : None in addition to the above sections.

#### 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 of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point / Freezing point	: -78,5 °C At atmospheric pressure dry ice sublimates into gaseous carbon dioxide.
Boiling point	: -56,6 °C
Flash point	: Not applicable for gases and gas mixtures.
Flammability	: Non flammable.
Explosive limits	: Non flammable.
Lower explosive limit (LEL)	: Not available
Upper explosive limit (UEL)	: Not available
Vapour pressure [20°C]	: 57,3 bar(a)
Vapour pressure [50°C]	: Not applicable.
Density	: Not applicable
Vapour density	: Not applicable.
Relative density, liquid (water=1)	: 0,82
Relative density, gas (air=1)	: 1,52
Water solubility	: 2000 mg/l
Partition coefficient n-octanol/water (Log Kow)	: 0,83
Auto-ignition temperature	: Non flammable.

Decomposition temperature	: Not applicable.
Viscosity, kinematic	: No reliable data available.
Particle characteristics	: Not applicable

### 9.2. Other information

#### 9.2.1. Information with regard to physical hazard classes

Oxidising properties	: No oxidising properties.
Critical temperature [°C]	: 30 °C

#### 9.2.2. Other safety characteristics

Molar mass	: 44 g/mol
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

Avoid moisture in installation systems.

### 10.5. Incompatible materials

For additional information on compatibility refer to ISO 11114.  
Materials such as carbon steel, low alloy carbon steel and plastic become brittle at low temperatures and are subject to failure. Use appropriate materials compatible with the cryogenic conditions present in refrigerated liquefied gas systems.

### 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	: Toxicological effects not expected from this product if occupational exposure limit values are not exceeded.
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**

**Other information** : 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.  
For more information, see 'EIGA Safety Info 24: Carbon Dioxide, Physiological Hazards' at [www.eiga.eu](http://www.eiga.eu).  
The substance/mixture has no endocrine disrupting properties.

## **SECTION 12: Ecological information**

### **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.  
Not expected to bioaccumulate due to the low log Kow (log Kow < 4).  
See section 9.

### **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** : No effect on the ozone layer.  
**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).

## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

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.  
Return unused product in original container to supplier.

**List of hazardous waste codes (from Commission Decision 2000/532/EC as amended)** : 16 05 05 : Gases in pressure containers other than those mentioned in 16 05 04.

### **13.2. Additional information**

External treatment and disposal of waste should comply with applicable local and/or national regulations.

### 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

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 established.

Transport by air (ICAO-TI / IATA-DGR) : Not established.

Transport by sea (IMDG) : Not established.

#### 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

##### 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 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. 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.  
Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

#### National regulations

Regulatory reference : Ensure all national/local regulations are observed.

### 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.

Section	Changed item	Change	Comments
	UN-No. (RID)	Added	
	Reference number	Modified	
	Supersedes	Modified	
	Revision date	Modified	
	Relevant identified uses	Modified	
	Safe handling of the gas receptacle	Modified	
	Acute toxicity - comment	Modified	
2.3	Other hazards which do not result in classification	Modified	
8	Regulatory reference	Added	
8	Regulatory reference	Added	
8	Regulatory reference	Added	
8	Regulatory reference	Added	
8.1	Local name	Added	
8.1	Local name	Added	
8.1	Local name	Added	
8.1	Local name	Added	
8.1	OEL TWA [ppm]	Added	
8.1	OEL TWA	Added	
8.1	TGG-8u (OEL TWA)	Added	
8.1	IOEL TWA [ppm]	Added	
8.1	IOEL TWA	Added	
8.1	OEL STEL [ppm]	Added	

# Safety Data Sheet

## Carbon dioxide (refrigerated)

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878  
Reference number: EIGA018B-ALBNL

8.1	OEL STEL	Added	
8.1	OEL TWA [ppm]	Added	
8.1	OEL TWA	Added	
8.1	Remark	Added	
8.2	Respiratory protection	Modified	
9.1	Oxidising properties	Modified	
9.1	Flash point	Removed	
11.1	Other information	Added	
14.3	Danger labels (RID)	Added	

### Abbreviations and acronyms

: ATE - Acute Toxicity Estimate  
 CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008  
 REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006  
 EINECS - European Inventory of Existing Commercial Chemical Substances  
 CAS# - Chemical Abstract Service number  
 PPE - Personal Protection Equipment  
 LC50 - Lethal Concentration to 50 % of a test population  
 RMM - Risk Management Measures  
 PBT - Persistent, Bioaccumulative and Toxic  
 vPvB - Very Persistent and Very Bioaccumulative  
 STOT- SE : Specific Target Organ Toxicity - Single Exposure  
 CSA - Chemical Safety Assessment  
 EN - European Standard  
 UN - United Nations  
 ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road  
 IATA - International Air Transport Association  
 IMDG code - International Maritime Dangerous Goods  
 RID - Regulations concerning the International Carriage of Dangerous Goods by Rail  
 WGK - Water Hazard Class  
 STOT - RE : Specific Target Organ Toxicity - Repeated Exposure  
 UFI : Unique Formula Identifier

### Training advice

: The hazard of asphyxiation is often overlooked and must be stressed during operator training.  
 For more guidance, refer to EIGA SL 01 "Dangers of Asphyxiation", downloadable at <http://www.eiga.eu..>

### Further information

: Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).  
 Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

Full text of H- and EUH-statements	
H281	Contains refrigerated gas; may cause cryogenic burns or injury.
Press. Gas (Ref. Liq.)	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**