



SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Carbon dioxide, solid (Dry ice)

Issue Date:	10.09.2014	Version: 1.2	SDS No.: 000010022548
Revision Date:	28.07.2023		1/19
Last revised date :	25.08.2021		

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

1.1 Product identifier

Product name: Carbon dioxide, solid (Dry ice)
Trade name: BIOGON® C Dry Ice, Torr-is, Carbon Dioxide 2.7 Pellets, Dry Ice pellets

Additional identification

Chemical name: Carbon dioxide
Chemical formula: CO₂
INDEX No. -
CAS-No. 124-38-9
EC No. 204-696-9
REACH Registration No. 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

Identified uses: Industrial and professional. Perform risk assessment prior to use. Blast cleaning. Cooling applications. Food freezing. Freezing, Cooling and heat transfer. Laboratory use. Special effects (entertainment). Consumer use. It is the responsibility of the end user to ensure that the product as supplied is suitable for its intended use.
Uses advised against Industrial or technical grade unsuitable for medical and/or food applications or inhalation.

1.3 Details of the supplier of the safety data sheet

Supplier
 Linde Gas AB Telephone: +46 8 7069500
 Rättarvägen 3
 169 68 Solna
E-mail: sds.ren@linde.com

1.4 Emergency telephone number: Poison center: 020-99 60 00 (24 h). Emergency number: 112



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SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.

Not classified

2.2 Label Elements Not applicable

Precautionary Statements

General None.

Prevention: None.

Response: None.

Storage: P403: Store in a well-ventilated place.

Disposal None.

Supplemental information

EIGA-As: Asphyxiant in high concentrations.



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2.3 Other hazards

Refrigerated solidified gas, exists at -78,5 °C. Contact with product may cause severe cold burns or frostbite. Asphyxiant in high concentrations.

Endocrine disrupting properties-Toxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties-Ecotoxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.



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SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name Carbon dioxide
INDEX No.: -
CAS-No.: 124-38-9
EC No.: 204-696-9
REACH Registration No.: Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.
Purity: 100%
 The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name: BIOGON® C Dry Ice, Torr-is, Carbon Dioxide 2.7 Pellets, Dry Ice pellets

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	M-Factor:	Notes
Carbon dioxide	CO2	100%	124-38-9	204-696-9	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.	-	#

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.

This substance has workplace exposure limit(s).

This substance is listed as SVHC.PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.



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SECTION 4: First aid measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: Low concentrations of CO2 cause increased respiration and headache. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact: In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Get medical attention immediately.

Skin Contact: In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Get medical attention.

Ingestion: Swallowing must be absolutely avoided, since coldness and developing pressure could be dangerous. Obtain medical attention and take along these instructions.

4.2 Most important symptoms and effects, both acute and delayed: Respiratory arrest.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Respiratory arrest.

Treatment: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.



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SECTION 5: Firefighting measures

General Fire Hazards: No specific recommendations.

5.1 Extinguishing media

Suitable extinguishing media: Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.

Unsuitable extinguishing media: None.

5.2 Special hazards arising from the substance or mixture: None.

5.3 Advice for firefighters

Special fire-fighting procedures: No unusual fire or explosion hazards noted.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so.



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6.3 Methods and material for containment and cleaning up: Provide adequate ventilation.

6.4 Reference to other sections: Refer to sections 8 and 13.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling: Do not use in confined spaces without adequate ventilation and/or respirator. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Provide adequate ventilation. When using do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities: Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers.

7.3 Specific end use(s): None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

Chemical name	Type	Form of exposure	Exposure Limit Values		Source
Carbon dioxide	NGV		5.000 ppm	9.000 mg/m ³	Sweden. Occupational Exposure Limit Values, as amended (2018)
	KTV		10.000 ppm	18.000 mg/m ³	Sweden. Occupational Exposure Limit Values, as amended (2018)
	TWA		5.000 ppm	9.000 mg/m ³	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (12 2009)
	TWA		5.000 ppm	9.000 mg/m ³	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC,



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				2009/161/EU, 2017/164/EU, as amended (12 2009)
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Please refer to the latest edition of the appropriate source text and consult an industrial hygienist or similar professional, or local agencies, for further information.

Biological Limit Values

No biological exposure limits noted for the ingredient(s).

8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product. CO2 detectors should be used when CO2 may be released.

Individual protection measures, such as personal protective equipment

General information:

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. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Eye/face protection:

Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

Skin protection

Hand Protection:

Guideline: EN 511 Protective gloves against cold.
Additional Information: Wear cold insulating gloves.

Body protection:

Wear apron or protective clothing in case of contact.

Other:

Wear safety shoes while handling containers
Guideline: ISO 20345 Personal protective equipment - Safety footwear.



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Respiratory Protection:	When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used 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. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres
Thermal hazards:	Not applicable.
Hygiene measures:	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
Environmental exposure controls:	For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	solid
Form:	solid
Color:	Colorless
Odor:	Odorless
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.
Melting Point:	-69,9 °F/-56,6 °C
Boiling Point:	-71 °F/-57 °C (5,2 bar)
Flammability:	This product is not flammable.
Upper/lower limit on flammability or explosive limits	
Explosive limit - upper:	Not applicable
Explosive limit - lower:	Not applicable
Flash Point:	Not applicable to gases and gas mixtures.
Autoignition Temperature:	Not applicable.
Decomposition Temperature:	Not known.



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pH:	Not applicable
Viscosity	
Dynamic viscosity:	0,07 mPa.s (68 °F/20 °C)
Kinematic viscosity:	No data available.
Solubility(ies)	
Solubility in Water:	2,900 mg/l (77 °F/25 °C)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	0,83
Dispersion Stability:	No data available.
Vapor pressure:	45,1 bar (50 °F/10 °C)
Relative density:	No data available.
Density:	0,771 g/cm ³ (68,0 °F/20,0 °C) 0,7895 g/cm ³ (122,0 °F/50,0 °C)
Vapor density (air=1):	1,522 70 °F/21 °C
Particle characteristics	
Particle Size:	Not applicable
Particle Size Distribution:	Not applicable
Dustiness:	Not applicable
Specific surface area:	Not applicable
Surface charge/Zeta potential:	Not applicable
Assessment:	Not applicable
Shape:	Not applicable
Crystallinity:	Not applicable
Surface treatment:	Not applicable
9.2 Other information	
Flammability:	Ki: 1,5
Sublimation Point:	-109,3 °F/-78,5 °C
Molecular weight:	44,01 g/mol (CO ₂)
Critical Temp. (°C):	31,0 °C



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SECTION 10: Stability and reactivity

- 10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.
- 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: No reaction with any common materials in dry or wet conditions.
- 10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

General information: In high concentrations may cause rapid circulatory deterioration even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and even death.

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

- Acute toxicity - Oral Product** Based on available data, the classification criteria are not met.
- Acute toxicity - Dermal Product** Based on available data, the classification criteria are not met.
- Acute toxicity - Inhalation Product** Based on available data, the classification criteria are not met.
- Skin Corrosion/Irritation Product** Based on available data, the classification criteria are not met.
- Serious Eye Damage/Eye Irritation Product** Based on available data, the classification criteria are not met.



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Respiratory or Skin Sensitization

Product Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity

Product Based on available data, the classification criteria are not met.

Carcinogenicity

Product Based on available data, the classification criteria are not met.

Reproductive toxicity

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure

Product Based on available data, the classification criteria are not met.

Aspiration Hazard

Product Not applicable to gases and gas mixtures..

11.2 Information on other hazards

Endocrine disrupting properties

Product: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Components:

Carbon dioxide The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Other information

Product: No data available.



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SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity
Product

No ecological damage caused by this product.

12.2 Persistence and Degradability
Product

Not applicable to gases and gas mixtures..

12.3 Bioaccumulative potential
Product

The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in soil
Product

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

12.5 Results of PBT and vPvB assessment
Product

Not classified as PBT or vPvB.

Global Warming Potential

Global warming potential: 1
When discharged in large quantities may contribute to the greenhouse effect.

Carbon dioxide

12.6 Endocrine disrupting properties:

Product:

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Components:

Carbon dioxide

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.



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12.7 Other adverse effects:

Other hazards

Product: No data available.

Other effects:

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.

Disposal methods: 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. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes

Container: 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.

SECTION 14: Transport information

IMDG

14.1 UN number or ID number: UN 1845
 14.2 UN Proper Shipping Name: CARBON DIOXIDE, SOLID
 14.3 Transport Hazard Class(es)
 Class: 9
 Label(s): 9
 EmS No.: F-C, S-V
 14.4 Packing Group: -
 Limited quantity: None.



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Excepted quantity E0
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -

IATA

14.1 UN number or ID number: UN 1845
 14.2 Proper Shipping Name: Carbon dioxide, solid
 14.3 Transport Hazard Class(es):
 Class: 9
 Label(s): 9MI
 14.4 Packing Group: -
 Limited quantity None.
 Excepted quantity E0
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -
 Other information
 Passenger and cargo aircraft: Allowed.
 Cargo aircraft only: Allowed.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

Additional identification: 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.

SECTION 15: Regulatory information

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

EU Regulations

EU. REACH Annex XIV, Substances Subject to Authorization as amended: None present or none present in regulated
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quantities.

Directive 96/61/EC: concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution Emission Registry (EPER):

Chemical name	CAS-No.	Concentration
Carbon dioxide	124-38-9	100%

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, Annex I:

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 2016/425/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 2020/878.

15.2 Chemical safety assessment: Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration. A CSA does not need to be carried out for this product.

SECTION 16: Other information

Revision Information: Not relevant.

Abbreviations and acronyms:

ECLTV: EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended
Sweden. Occupational Exposure Limit Values, as amended
SWO: Time Weighted Average (TWA):
ECLTV / TWA: Short Term Exposure Limit (STEL):
SWO / KTV: Time Weighted Average (TWA):
SWO / NGV:

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the
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German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; EIGA - European Industrial Gases Association; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative



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Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:

- Agency for Toxic Substances and Diseases Registry (ATSDR) (<http://www.atsdr.cdc.gov/>).
- European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
- European Chemical Agency: Information on Registered Substances <http://apps.echa.europa.eu/registered/registered-sub.aspx#search>
- European Industrial Gases Association (EIGA) Doc. 169 "Classification and Labelling guide", as amended.
- International Programme on Chemical Safety (<http://www.inchem.org/>)
- ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
- Matheson Gas Data Book, 7th Edition.
- National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
- The ESIS (European chemical Substances Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).
- The European Chemical Industry Council (CEFIC) ERICards.
- United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)
- Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
- Substance specific information from suppliers.

Details given in this document are believed to be correct at the time of publication.

Wording of the H-statements in section 2 and 3

Training information:

Users of breathing apparatus must be trained. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Ensure operators understand the hazards.

Other information:

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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. A safety data sheet is not required for this product under Article 31 of REACH. This Product Safety Information Sheet has been created on a voluntary basis.



SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Carbon dioxide, solid (Dry ice)

Issue Date:	10.09.2014	Version: 1.2	SDS No.: 000010022548
Revision Date:	28.07.2023		19/19
Last revised date :	25.08.2021		

Last revised date:

28.07.2023

Disclaimer:

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.