Material Safety Data Sheet

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Version 1.7
Regulation (EC) No 1907/2006

1 - Product and Company Information

Product Name	CARBON DIOXIDE, 99.8+%
Product Number	295108
Company	Sigma-Aldrich Chemie GmbH Riedstrasse 2 89555 Steinheim Germany
Technical Phone #	49-89-6513(0)-1444
Fax	49-7329-97-2319
E-mail Address	eurtechserv@sial.com
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2 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Not hazardous according to Directive 67/548/EEC.

3 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
CARBON DIOXIDE GAS	124-38-9	204-696-9	None

Formula	CO2
Molecular Weight	44.01 AMU
Synonyms	Anhydride carbonique (French) * Carbon dioxide (ACGIH:OSHA) * Carbonic acid anhydride * Carbonic acid gas * Carbonic anhydride * Carbon oxide * Dry ice * Khladon 744 * Kohlendioxyd (German) * Kohlensaure (German) * R 744

4 - First Aid Measures

AFTER INHALATION
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT
In case of contact, immediately wash skin with soap and copious amounts of water.

AFTER EYE CONTACT
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Use water spray or fog nozzle to keep cylinder cool. Move cylinder away from fire if there is no risk.

SPECIAL RISKS
Specific Hazard(s): Emits toxic fumes under fire conditions. Explosion Hazards: Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area and keep personnel upwind. Shut off leak if there is no risk.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe gas. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed. Cylinder temperature should not exceed 125°F (52°C).

SPECIAL REQUIREMENTS: Contents under pressure. Do not heat above 50°C.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Mechanical exhaust required. Safety shower and eye bath.

WORK PRACTICES
Store and use with adequate ventilation.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	9000 MG/M3
Poland		NDSCh	27000 MG/M3
Poland		NDSP	-

EXPOSURE LIMITS - DENMARK

	Source	Type	Value
	OEL	TWA	9,000 mg/m3

		5,000 ppm

EXPOSURE LIMITS - GERMANY

Source	Type	Value
TRGS 900	OEL	9,000 mg/m3
		5,000 ppm

Remarks: 4

EXPOSURE LIMITS - NORWAY

Source	Type	Value
	OEL	9,000 mg/m3
		5,000 ppm

EXPOSURE LIMITS - SWEDEN

Source	Type	Value
	LLV (Level	9,000 mg/m3
		5,000 ppm

EXPOSURE LIMITS - SWITZERLAND

Source	Type	Value
OEL	OEL	9,000 mg/m3
		5,000 ppm

EXPOSURE LIMITS - UNITED KINGDOM

Source	Type	Value
OEL	OEL	9,150 mg/m3
		5,000 ppm
OEL	STEL	27,400 mg/m3
		15,000 ppm

Remarks: Indicative limit value

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection is desired, use multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance — Physical State: Compressed gas

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	- 78.5 °C	
Flash Point	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	42940 mmHg	20 °C
SG/Density	N/A	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	1.52 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	

Bulk Density	N/A
Decomposition Temp.	N/A
Solvent Content	N/A
Water Content	N/A
Surface Tension	N/A
Conductivity	N/A
Miscellaneous Data	N/A
Solubility	N/A

10 - Stability and Reactivity

STABILITY
Stable: Stable.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon dioxide.

11 - Toxicological Information

RTECS NUMBER: FF6400000

ACUTE TOXICITY

LCLO
Inhalation
Human
9 PPH/5M

SIGNS AND SYMPTOMS OF EXPOSURE
Nausea, dizziness, and headache. Exposure can cause: Low to medium concentrations of carbon dioxide can cause respiratory stimulation, affect regulation of blood circulation, and the acidity of body fluids. High concentrations are dangerous due to increased breathing and heart rates and change in body acidity. Very high concentrations can cause unconsciousness and death.

ROUTE OF EXPOSURE
Skin Contact: Can cause severe frostbite.
Inhalation: Can cause rapid suffocation.
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption.

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 6 PPH/24H
Route of Application: Inhalation
Exposure Time: (10D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Respiratory system.

Species: Rabbit
Dose: 13 PPH/4H
Route of Application: Inhalation
Exposure Time: (9-12D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 6 PPH/24H
Route of Application: Inhalation
Exposure Time: (10D PREG)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse
Dose: 55 PPH/2H
Route of Application: Inhalation
Exposure Time: (3D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Species: Mouse
Dose: 55 PPH/4H
Route of Application: Inhalation
Exposure Time: (6D MALE)
Result: Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Mouse
Dose: 2 PPH/8H
Route of Application: Inhalation
Exposure Time: (10D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

12 - Ecological Information

No data available.

13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

CONTAMINATED CONTAINER DISPOSAL
Caution: no-return cylinder. Do not reuse. Empty cylinder will contain hazardous residue. Follow proper disposal techniques.

14 - Transport Information

RID/ADR
UN#: 1013
Class: 2.2
Proper Shipping Name: Carbon dioxide

IMDG
UN#: 1013
Class: 2.2
Proper Shipping Name: Carbon dioxide
Marine Pollutant: No
Severe Marine Pollutant: No

IATA
UN#: 1013
Class: 2.2
Proper Shipping Name: Carbon dioxide

Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

S-PHRASES: 9

Keep container in a well-ventilated place.

Not hazardous according to Directive 67/548/EEC.

COUNTRY SPECIFIC INFORMATION

Germany

WGK: No hazard to waters.

ID-Number: 256

KBwS-Decision

16 - Other Information

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

DISCLAIMER

For R&D use only. Not for drug, household or other uses.