



SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
US OSHA HCS 2024

Issuing Date 04-Apr-2000

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Revision Number 9.01

1. Identification

Product identifier

Product Name CARBON DIOXIDE, LIQUID

Other means of identification

UN number or ID number UN2187

Synonyms CARBONIC ACID; CARBON DIOXIDE LIQUID; CARBON DIOXIDE, REFRIGERATED LIQUID; CARBONIC ANHYDRIDE, REFRIGERATED LIQUID; UN 2187; CO2

Other information Classification determined in accordance with Compressed Gas Association standards.

Recommended use of the chemical and restrictions on use

Recommended use Industrial and Specialty Gas Applications

Restrictions on use No information available

Details of the supplier of the safety data sheet

Manufacturer Address

Nippon Sanso Matheson, Inc.
909 Lake Carolyn Parkway
Suite 1100
Irving, TX 75039
General Information: 1-800-416-2505

Emergency telephone number

Emergency telephone CHEMTREC: +1-703-527-3887 (INTERNATIONAL)
1-800-424-9300 (NORTH AMERICA)

2. Hazard(s) identification

Classification of the substance or mixture

Gases under pressure	Refrigerated liquefied gas
Simple asphyxiants	Yes

Hazards not otherwise classified (HNOC)

Not applicable.

Label elements

Warning

**Hazard statements**

Contains refrigerated gas; may cause cryogenic burns or injury.
May displace oxygen and cause rapid suffocation.

Precautionary Statements - Prevention

Wear cold insulating gloves and either face shield or eye protection.

Precautionary Statements - Response

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

Precautionary Statements - Storage

Store in a well-ventilated place.

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available.

Other information

May cause frostbite upon sudden release of liquefied gas.

3. Composition/information on ingredients**Substance**

Chemical name	CAS No.	Weight-%	Trade secret
Carbon dioxide	124-38-9	100	-

4. First-aid measures**Description of first aid measures****Inhalation**

Remove person to fresh air and keep comfortable for breathing. Artificial respiration and/or oxygen may be necessary. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Eye contact

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical attention.

Skin contact

Get immediate medical attention. If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). If warm water is not available, gently wrap affected parts in blankets.

Ingestion

Get immediate medical attention.

Most important symptoms and effects, both acute and delayed**Symptoms**

Contains refrigerated gas; may cause cryogenic burns or injury. Suffocation.

Effects of Exposure None known.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically. For inhalation, consider oxygen.

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media Do not direct water at source of leak or safety devices; icing may occur.

Specific hazards arising from the chemical Negligible fire hazard. Cylinders may rupture under extreme heat.

Hazardous combustion products Carbon oxides, Oxygen.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge None.

Special protective equipment and precautions for fire-fighters Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until well after fire is out. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing gas. Wear personal protective clothing and equipment, see Section 8.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Do not touch or walk through spilled material. Use water spray to reduce vapors or divert vapor cloud drift. Do not direct water at spill or source of leak. Keep unnecessary and unprotected personnel away from spillage. Ventilate the area. If possible, turn leaking containers so that gas escapes rather than liquid. Stay upwind and keep out of low areas.

Methods for cleaning up Eliminate all ignition sources if safe to do so. Damaged cylinders should be handled only by specialists.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. Handling and storage

Precautions for safe handling

Advice on safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing gas. Use only outdoors or in a well-ventilated area. Ensure adequate ventilation. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Wear personal protective equipment. Close valve after each use and when empty.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight. Store in accordance with local regulations. Keep away from Incompatible materials. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Protect from physical damage. For additional and specific safe practices consult the following Compressed Gas Association (CGA) publications: P-1 "Safe Handling of Compressed Gases in Cylinders", AV-1 "Safe Handling and Storage of Compressed Gases", and "Compressed Gas Handbook".

8. Exposure controls/personal protection

Control Parameters

Exposure Limits

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
Carbon dioxide 124-38-9	TWA: 5000 ppm STEL: 30000 ppm	TWA: 5000 ppm TWA: 9000 mg/m ³ (vacated) TWA: 10000 ppm (vacated) TWA: 18000 mg/m ³ (vacated) STEL: 30000 ppm (vacated) STEL: 54000 mg/m ³	TWA: 5000 ppm; TWA: 9000 mg/m ³ ; STEL: 30000 ppm STEL: 54000 mg/m ³ IDLH: 40000 ppm

Biological occupational exposure limits This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Appropriate engineering controls

Engineering controls Provide local exhaust ventilation. Apply technical measures to comply with the occupational exposure limits.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear splash resistant safety goggles, face shield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Hand protection Wear cold insulating gloves.

Skin and body protection Wear appropriate protective, cold insulating clothing.

Respiratory protection For Unknown Concentrations or Immediately Dangerous to Life or Health - Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquefied gas
Physical state	Gas
Color	Colorless
Odor (includes odor threshold)	Odorless

Property	Values	Remarks • Method
Melting point / freezing point	-57 °C / -70.6 °F	@ 4000 mmHg
Boiling point (or initial boiling point or boiling range)	-78.5 °C / -109.30 °F	Sublimation point
Flammability		Not flammable
Flammability Limit in Air		
Upper flammability or explosive limits		No data available
Lower flammability or explosive limits		No data available
Flash point		No data available
Autoignition temperature		No data available
Decomposition temperature		No data available
SADT (°C)		No data available
pH		Acidic in solution
pH (as aqueous solution)		No data available
Kinematic viscosity		No data available
Dynamic viscosity	7.01E-05 Pa.s	
Solubility	Hydrocarbons, Organic solvents, Alcohol, Acetone	
Water solubility	Soluble	
Partition coefficient n-octanol/water (log value)		No data available
Vapor pressure (includes evaporation rate)	569 mmHg	@ 21 °C
Evaporation rate		No data available
Density and/or relative density	1.527	@ 21 °C
Bulk density	1.4-1.6 g/cm ³	No data available
Liquid Density		No data available
Relative vapor density	1.5	(air = 1)
Particle characteristics		
Particle Size		No data available
Particle Size Distribution		No data available

Other information

Molecular formula	CO ₂
Molecular weight	44.01
VOC content	No information available
Softening point	No information available

Information with regard to physical hazard classes

Explosives	
Explosive properties	No information available
Gases under pressure	
Critical Temperature °C	30.98 °C
Oxidizing properties	No information available

10. Stability and reactivity

Reactivity	None under normal use conditions.
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Chemical stability	Stable under normal conditions.
Possibility of hazardous reactions	None under normal processing.
Conditions to avoid	Excessive heat. Protect from physical damage. Containers may rupture or explode if exposed to heat. Incompatible materials.
Incompatible materials	Combustible material, Oxidizing materials, Metal salts, Reducing agent, Metal carbide, Metals, Bases, Potassium, Sodium, Ethyleneimine.
Hazardous decomposition products	Carbon oxides, Oxygen.

11. Toxicological information

Information on likely routes of exposure

Product Information

Inhalation	Suffocation. Ringing in ears. Nausea. Irregular heartbeat. Headache. Drowsiness. Dizziness. Tingling sensation. Visual disturbances. Convulsions. Coma.
Eye contact	Contact with product may cause frostbite. Blurred vision.
Skin contact	Contact with product may cause frostbite. Blisters.
Ingestion	Ingestion of gas unlikely.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms	Contains refrigerated gas; may cause cryogenic burns or injury. Suffocation.
Acute toxicity	Based on available data, the classification criteria are not met.

Numerical measures of toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Carbon dioxide 124-38-9	-	-	= 167857 ppm (Rat) 4h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	No information available.
Serious eye damage/eye irritation	No information available.
Respiratory or skin sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	No information available.
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.

Aspiration hazard	Not applicable.
Other adverse effects	Medical conditions aggravated by exposure: Heart or cardiovascular disorders, Respiratory disorders.
Interactive effects	No information available.

12. Ecological information

Ecotoxicity	Avoid release to the environment.
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<u>Persistence and degradability</u>	No information available.
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<u>Bioaccumulative potential</u>	No information available.
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<u>Mobility in soil</u>	No information available.
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<u>Other adverse effects</u>	No information available.
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13. Disposal considerations

Disposal methods

Waste from residues/unused products	Dispose of contents/container in accordance with local, regional, national, and international regulations as applicable.
Contaminated packaging	Do not reuse empty containers.

14. Transport information

DOT

UN number or ID number	UN2187
Proper shipping name	Carbon dioxide, refrigerated liquid
Transport hazard class(es)	2.2
Special Provisions	T75, TP5
DOT Marine Pollutant	NP
Description	UN2187, Carbon dioxide, refrigerated liquid, 2.2
Emergency Response Guide Number	120

IATA

UN number or ID number	UN2187
UN proper shipping name	Carbon dioxide, refrigerated liquid
Transport hazard class(es)	2.2
Environmental hazards	No

ERG Code 2L
Description UN2187, Carbon dioxide, refrigerated liquid, 2.2

IMDG

UN number or ID number UN2187
UN proper shipping name Carbon dioxide, refrigerated liquid
Transport hazard class(es) 2.2
Marine pollutant indicator NP
EmS-No. F-C, S-V
Description UN2187, Carbon dioxide, refrigerated liquid, 2.2

15. Regulatory information**International Inventories**

Contact supplier for inventory compliance status

US Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CAA (Clean Air Act)

This product does not contain any substances regulated as pollutants pursuant to Clean Air Act (CAA).

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Carbon dioxide 124-38-9	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

16. Other information

NFPA	Health hazards 0	Flammability 0	Instability 0	Special hazards SA
HMIS	Health hazards 0	Flammability 0	Physical hazards 2	Personal protection -

Key or legend to abbreviations and acronyms used in the safety data sheet

List may include phrases which are not applicable to this product

ACGIH	American Conference of Governmental Industrial Hygienists
ADN	Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (Europe)
ADR	Agreement concerning the International Carriage of Dangerous Goods by Road (Europe)
AIIC	Australian Inventory of Industrial Chemicals
ATE	Acute Toxicity Estimate
ASTM	American Society for the Testing of Materials
bar	Biological Reference Values for Chemical Compounds in the Work Area
BAT	Biological tolerance values for occupational exposure
BEL	Biological exposure limits
bw	Body weight
Ceiling	Maximum limit value
CMR	Carcinogen, Mutagen or Reproductive Toxicant
DOT	Department of Transportation (United States)
DSL	Domestic Substances List (Canada)
EmS	Emergency Schedule
ENCS	Existing and New Chemical Substances (Japan)
EPA	U.S. Environmental Protection Agency
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System
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
ICAO	International Civil Aviation Organization
IECSC	Inventory of Existing Chemical Substances in China
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
ISO	International Organization for Standardization
KECI	Korean 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
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
n.o.s.	Not Otherwise Specified
NOAEC	No Observed Adverse Effect Concentration

NOAEL	No Observed Adverse Effect Level
NOELR	No Observable Effect Loading Rate
NTP	National Toxicology Program (United States)
NZIoC	New Zealand Inventory of Chemicals
OECD	Organization for Economic Cooperation and Development
OEL	Occupational exposure limits
OSHA	Occupational Safety and Health Administration of the US Department of Labor
PBT	Persistent, Bioaccumulative and Toxic substance
PICCS	Philippines Inventory of Chemicals and Chemical Substances
PMT	Persistent, Mobile and Toxic
PPE	Personal protective equipment
QSAR	Quantitative Structure Activity Relationship
RID	Agreement concerning the International Carriage of Dangerous Goods by Rail (Europe)
SADT	Self-Accelerating Decomposition Temperature
SAR	Structure-activity relationship
SARA	Superfund Amendments and Reauthorization Act
SDS	Safety Data Sheet
SL	Surface Limit
STEL	Short Term Exposure Limit
STOT RE	Specific target organ toxicity - Repeated exposure
STOT SE	Specific target organ toxicity - Single exposure
TCSI	Taiwan Chemical Substance Inventory
TDG	Transport of Dangerous Goods (Canada)
TSCA	Toxic Substances Control Act (United States)
TWA	Time-Weighted Average
UN	United Nations
VOC	Volatile organic compounds
vPvB	Very Persistent and Very Bioaccumulative
vPvM	Very Persistent and Very Mobile
As	Allergenic substance
DS	Dermal Sensitizer
Ot	Ototoxicant
pOt	Ototoxicant - potential to cause hearing disorders
PS	Photosensitizer
RS	Respiratory Sensitizer
S	Sensitizer
poS	Sensitizer - capable of causing occupational asthma
Sa	Simple asphyxiant
Sd	Skin designation
pSd	Skin designation - potential for cutaneous absorption
Sdv	Skin designation - vacated
Sk	Skin notation
dSk	Skin notation - danger of cutaneous absorption
pSk	Skin notation - potential for cutaneous absorption

Key literature references and sources for data used to compile the SDS

U.S. Agency for Toxic Substances and Disease Registry (ATSDR)
 U.S. Environmental Protection Agency ChemView Database
 European Food Safety Authority (EFSA)
 U.S. Environmental Protection Agency
 Acute Exposure Guideline Level(s) (AEGL(s))
 U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
 U.S. Environmental Protection Agency High Production Volume Chemicals
 Food Research Journal
 Hazardous Substance Database

International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
U.S. National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
International Organization for Economic Co-operation and Development (OECD) Environment, Health, and Safety Publications
International Organization for Economic Co-operation and Development (OECD) High Production Volume Chemicals Program
International Organization for Economic Co-operation and Development (OECD) Screening Information Data Set
United Nations World Health Organization (WHO)

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Revision Note Company logo. Company Name. Company contact information.

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End of Safety Data Sheet