



Material Safety Data Sheet

R-744

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R-744
OTHER NAME: Carbon Dioxide
USE: Refrigerant gas
DISTRIBUTOR: National Refrigerants, Inc.
661 Kenyon Avenue
Bridgeton, New Jersey 08302

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-5:00pm)
1-800-262-0012

IN CASE OF EMERGENCY CALL:
CHEMTREC: 1-800-424-9300

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Gases under pressure, Liquefied Gas
SIGNAL WORD: WARNING
HAZARD STATEMENT: Contains gas under pressure, may explode if heated
SYMBOL: Gas Cylinder
PRECAUTIONARY STATEMENT: STORAGE: Protect from sunlight, store in a well ventilated place



EMERGENCY OVERVIEW: Cold liquid and gas under pressure. Can cause rapid suffocation. Can increase respiration and heart rate. May cause nervous system damage. May cause frostbite. May cause dizziness and drowsiness. Self contained breathing apparatus and protective clothing may be required by rescue workers. This product is a colorless, odorless liquid that transforms to white crystalline particles when discharged from its container. The gas is slightly acidic and may be felt to have a slight, pungent odor and biting taste.

POTENTIAL HEALTH HAZARDS

EFFECTS OF A SINGLE ACUTE OVEREXPOSURE

SKIN: No harm expected from vapor. Prolonged contact with carbon dioxide could cause frostbite. Cold gas or liquid may cause severe frostbite.

EYES: No harm expected from vapor. Prolonged contact with carbon dioxide could cause frostbite. Cold gas or liquid may cause severe frostbite.

INHALATION: Carbon Dioxide is an asphyxiant with effect due to lack of oxygen. It is also physiologically active, affecting circulation and breathing. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation, rapid breathing and heart rate, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

INGESTION: An unlikely route of exposure. This product is a gas at normal temperature and pressure, but may cause severe frostbite.



DELAYED EFFECTS: No harm expected to healthy individuals. Where competent medical authority deems that such illness would be aggravated by exposure to carbon dioxide, persons in ill health should be restricted from working with or handling.

OTHER EFFECTS OF OVEREXPOSURE: Damage to retinal or ganglion cells and central nervous system may occur.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of carbon dioxide suggest that overexposure is unlikely to aggravate existing medical conditions.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<u>INGREDIENT NAME</u>	<u>NTP STATUS</u>	<u>IARC STATUS</u>	<u>OSHA LIST</u>
No ingredients listed in this section			

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Carbon Dioxide	124-38-9	100%

There are no impurities or stabilizers that contribute to the classification of the material identified in Section 2

4. FIRST AID MEASURES

SKIN: Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not to exceed 105°F (41°C)) water. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist.

EYES: Immediately flush eyes with large amounts of warm water for at least 15 minutes (in case of frostbite, water should be lukewarm, (not to exceed 105°F (41°C)) lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention immediately.

INGESTION: Ingestion is an unlikely route of exposure. This product is a gas at normal temperature and pressure.

ADVICE TO PHYSICIAN: Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	None
FLASH POINT METHOD:	Not applicable
AUTOIGNITION TEMPERATURE:	Unknown
UPPER FLAME LIMIT (volume % in air):	None
LOWER FLAME LIMIT (volume % in air):	None
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	Not applicable



EXTINGUISHING MEDIA:

Use any standard agent – choose the one most appropriate for type of surrounding fire (material itself is not flammable)

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Carbon Dioxide cannot catch fire. Heat of fire can build pressure in cylinder and cause it to rupture. No part of the container should be exposed to a temperature higher than 125°F. Liquid carbon dioxide containers are equipped with pressure relief devices.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

WARNING: High-pressure liquid and gas. Firefighters should wear appropriate gear for surrounding fire. Evacuate all personnel from impacted area. Immediately spray containers with water from maximum distance until cool, taking care not to spray water on to vents on top of container. Do not discharge sprays in to liquid carbon dioxide, which will freeze water rapidly. When containers have cooled, move them away from fire area if it can be done without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

6. ACCIDENTAL RELEASE MEASURES

WARNING! Cold liquid and gas under pressure

Carbon dioxide is an asphyxiant. Lack of oxygen can kill. Evacuate all personnel from release area. Use self contained breathing apparatus and protective clothing where needed. Liquid carbon dioxide will not “spill”. Flakes of carbon dioxide will form at pressures below 67 psig (461.95 kPa) and fall as snow. Shut off leak if you can do so without risk. Ventilate area or move container to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing entry.

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations

7. HANDLING AND STORAGE

NORMAL HANDLING:

Never allow any unprotected part of your body to touch un-insulated pipes or vessels containing refrigerated liquid. Flesh will stick to the extremely cold metal and tears when you try to pull it free. Use suitable hand truck to move containers. Containers must be handles and stored in an upright position. Do not drop or tip containers, or roll them on their sides. If valve is hard to open discontinue use and contact your supplier.

STORAGE RECOMMENDATIONS:

Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Do not store in a confined space. Carbon dioxide is heavier than air. It tends to accumulate near the floor of an enclosed space, displacing air and pushing it upward. This creates an oxygen deficient atmosphere near the floor. Ventilate the space before entry. Verify sufficient oxygen concentration. Close container valve after each use; keep closed even when empty. Use adequate pressure relief devices in systems and piping to prevent pressure build up.

INCOMPATIBILITIES:

Alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 1022°F (550°C), uranium above °F (750°C), magnesium above 1427°F (775°C).



8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Use local exhaust system, if necessary, to keep the concentration of carbon dioxide below all applicable exposure limits. Under certain conditions, general exhaust ventilation may be acceptable to keep carbon dioxide below the exposure limit

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Wear insulated neoprene gloves and safety shoes for handling cylinders. Select PPE in accordance with OSHA 29 CFR 1910.132 and 1910.133

EYE PROTECTION:

For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION:

None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL, use a self-contained NIOSH approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH approved gas mask with organic vapor canister.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
Carbon Dioxide	5000 ppm TWA (8hr)	5000 ppm TWA (8hr)	None

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

IDLH = 40,000ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Colorless liquid
PHYSICAL STATE:	Can be present as a liquid or a gas
MOLECULAR WEIGHT:	44.01
CHEMICAL FORMULA:	CO ₂
ODOR:	Slight pungent odor
SPECIFIC GRAVITY (water = 1.0):	1.22 @ 19.4°F (-7°C)
SOLUBILITY IN WATER (vol/vol at 68 F):	0.90
pH:	3.7 (for carbonic acid)
LIQUID DENSITY:	47.6 lb/cu.ft. (762 kg/cu.meter) (saturated at 21.1°C (70°F) at 1 atm)
SUBLIMATION POINT (at 1 atm):	-78.5°C (-109.3°F)
VAPOR PRESSURE:	838 psig @ 70°F
VAPOR DENSITY (air = 1.0):	1.52 @ 70°F (21.1°C)
EVAPORATION RATE:	High
% VOLATILES:	100
ODOR THRESHOLD:	Not applicable
FLAMMABILITY:	Nonflammable
LEL/UEL:	None/None
PARTITION COEFF(n-octanol/water)	Not available
AUTO IGNITION TEMP:	Not applicable



DECOMPOSITION TEMPERATURE Not available
VISCOSITY: Not applicable
FLASH POINT: Not applicable
(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE: The product is stable.

CONDITIONS TO AVOID: Contact with incompatible materials, exposure to electrical discharges and or high temperatures listed below.

INCOMPATIBLE MATERIALS: Alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 1022°F (550°C), uranium above 1382°F (750°C), magnesium above 1427°F (775°C).

DECOMPOSITION PRODUCTS: Electrical discharges and high temperatures decompose carbon dioxide in to carbon monoxide and oxygen. Decomposition in to toxic, flammable, and/or oxidizing materials under above stated conditions

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:Carbon Dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

CONCENTRATION	EFFECT
1%	Breathing rate increases slightly
2%	Breathing rate increases to 50% above the normal level. Prolonged exposure can cause headache, tiredness.
3%	Breathing increases to twice the normal rate and becomes labored. Weak narcotic effect. Impaired hearing, headache, increased blood pressure and heart rate.
4-5%	Breathing increases to approximately four times normal rate, symptoms of intoxication become evident, and slight choking may be felt.
5-10%	Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment, and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.
10-100%	Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.

DELAYED (CHRONIC) EFFECTS: A single study has shown an increase in heart defects in rats exposed to 6% carbon dioxide in air for 24 hours at different times during gestation. There is no evidence that carbon dioxide is teratogenic in humans.

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12. ECOLOGICAL INFORMATION

ECOTOXICITY: No adverse ecological effects expected

OTHER ADVERS EFFECTS: Carbon Dioxide does not contain any Class I or Class II ozone-depleting chemicals.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. TRANSPORT INFORMATION

US DOT ID NUMBER:	UN1013
US DOT PROPER SHIPPING NAME:	Carbon Dioxide
US DOT HAZARD CLASS:	2.2
US DOT PACKING GROUP:	Not applicable
US DOT RQ:	None

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.



15. REGULATORY INFORMATION

Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on the TSCA inventory

SARA TITLE III / CERCLA

“Reportable Quantities” (RQs) and/or “Threshold Planning Quantities” (TPQs) exist for the following ingredients.

INGREDIENT NAME

SARA / CERCLA RQ (lb.)

SARA EHS TPQ (lb.)

Carbon Dioxide

None

None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS:

IMMEDIATE : Yes

PRESSURE: Yes

DELAYED: No

REACTIVITY: No

FIRE: No

SARA 313 TOXIC CHEMICALS:

Carbon Dioxide is not subject to reporting under Section 313

STATE RIGHT-TO-KNOW

CALIFORNIA: Carbon Dioxide is not listed by California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

PENNSYLVANIA: Carbon Dioxide is subject to the Pennsylvania Worker and Community Right to Know Act.

16. OTHER INFORMATION

CURRENT ISSUE DATE: May, 2015

PREVIOUS ISSUE DATE: April 2014

OTHER INFORMATION: HMIS Classification: Health – 3, Flammability – 0, Reactivity – 0

NFPA Classification: Health – 3, Flammability – 0, Reactivity – 0

Regulatory Standards:

1. OSHA regulations for compressed gases: 29 CFR 1910.101

2. DOT classification per 49 CFR 172.101

DISCLAIMER:

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