Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
CARBON DIOXIDE, LIQUID

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

Chemical Family
inorganic liquid

Product Description
Classification determined in accordance with Compressed Gas Association standards.

Product Use
industrial.

Restrictions on Use
None known.

Details of the supplier of the safety data sheet
MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920
General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.
Gases Under Pressure - Refrigerated liquefied gas
Simple Asphyxiant

GHS Label Elements
Symbol(s)

Signal Word
Warning

Hazard Statement(s)
Contains refrigerated gas; may cause cryogenic burns or injury.
May displace oxygen and cause rapid suffocation.

Precautionary Statement(s)
Prevention
Wear cold insulating gloves/face shield/eye protection.

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

Storage
Store in a well-ventilated place.
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Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

Other Hazards
May cause frostbite upon sudden release of liquefied gas.

<table>
<thead>
<tr>
<th>Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAS</strong></td>
</tr>
<tr>
<td>124-38-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 4 - FIRST AID MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inhalation</strong></td>
</tr>
</tbody>
</table>
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

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

**Eyes**
Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**Ingestion**
If swallowed, get medical attention.

**Most Important Symptoms/Effects**

**Acute**
May cause cryogenic burns, frostbite

**Delayed**
no information on significant adverse effects.

**Note to Physicians**
For inhalation, consider oxygen.

<table>
<thead>
<tr>
<th>Section 5 - FIRE FIGHTING MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extinguishing Media</strong></td>
</tr>
<tr>
<td><strong>Suitable Extinguishing Media</strong></td>
</tr>
</tbody>
</table>
Use extinguishing agents appropriate for surrounding fire.

**Unsuitable Extinguishing Media**
Do not direct water at source of leak or safety devices; icing may occur.

**Special Hazards Arising from the Chemical**
Negligible fire hazard. Containers may rupture or explode if exposed to heat.

**Hazardous Combustion Products**
Oxides of carbon. Oxygen

**Fire Fighting Measures**
Move container from fire area if it can be done without risk. Damaged cylinders should be handled only by specialists. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Do not get water directly on material. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

**Special Protective Equipment and Precautions for Firefighters**
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Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

**Section 6 - ACCIDENTAL RELEASE MEASURES**

Personal Precautions, Protective Equipment and Emergency Procedures
Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up
Do not touch or walk through spilled material. Stop leak if possible without personal risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Prevent entry into sewers, drains, ditches, underground or confined spaces and waterways. Damaged cylinders should be handled only by specialists.

Environmental Precautions
Avoid release to the environment.

**Section 7 - HANDLING AND STORAGE**

Precautions for Safe Handling
Wear cold insulating gloves/face shield/eye protection. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.

Conditions for Safe Storage, Including any Incompatibilities
Store in a well-ventilated place.

Incompatible Materials
combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases, potassium, sodium, ethyleneimine

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

<table>
<thead>
<tr>
<th>Component Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbon dioxide</strong></td>
</tr>
<tr>
<td>ACGIH:</td>
</tr>
<tr>
<td>5000 ppm TWA</td>
</tr>
<tr>
<td>30000 ppm STEL</td>
</tr>
<tr>
<td>NIOSH:</td>
</tr>
<tr>
<td>5000 ppm TWA ; 9000 mg/m3 TWA</td>
</tr>
<tr>
<td>30000 ppm STEL ; 54000 mg/m3 STEL</td>
</tr>
<tr>
<td>OSHA (US):</td>
</tr>
<tr>
<td>5000 ppm TWA ; 9000 mg/m3 TWA</td>
</tr>
<tr>
<td>Mexico:</td>
</tr>
<tr>
<td>5000 ppm TWA VLE-PPT ; 9000 mg/m3 TWA VLE-PPT</td>
</tr>
<tr>
<td>15000 ppm STEL [PPT-CT] ; 27000 mg/m3 STEL [PPT-CT]</td>
</tr>
</tbody>
</table>
ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)
There are no biological limit values for any of this product's components.

Engineering Controls
Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment
Eye/face protection
Wear splash resistant safety goggles with a faceshield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection
For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

Respiratory Protection
The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 40,000 ppm. Any supplied-air respirator. Any self-contained breathing apparatus with a full facepiece. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. 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. Escape -. Any appropriate escape-type, self-contained breathing apparatus.

Glove Recommendations
Wear appropriate protective, cold insulating clothing.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>colorless gas</td>
</tr>
<tr>
<td>Odor</td>
<td>odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>-70 - -56.56 °C (-94 - -70 °F)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>-78.5 - -61.7 °C (-109 - -79 °F)</td>
</tr>
<tr>
<td>Boiling Point Range</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower Explosive Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper Explosive Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Density (air=1)</td>
<td>1.5</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>(Soluble )</td>
</tr>
<tr>
<td>Viscosity</td>
<td>7.01E-05 Pa.s</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Not available</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>1.101 at -37 °C</td>
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<tr>
<td>Flash Point</td>
<td>(None )</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>569 mmHg @ -82 °C</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>Not available</td>
</tr>
</tbody>
</table>
Safety Data Sheet

Material Name: CARBON DIOXIDE, LIQUID
SDS ID: 00225010

<table>
<thead>
<tr>
<th>Solubility (Other)</th>
<th>Not available</th>
<th>Density</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>compressed, liquefied gas</td>
<td>Sublimation</td>
<td>-78.5 °C (-109 °F)</td>
</tr>
<tr>
<td>Taste</td>
<td>acid taste</td>
<td>Volatility by Volume</td>
<td>100 %</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C-02</td>
<td>Molecular Weight</td>
<td>44.01</td>
</tr>
<tr>
<td>triple point</td>
<td>-56.6 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solvent Solubility
Soluble
Hydrocarbons, organic solvents, acetone, alcohol

Section 10 - STABILITY AND REACTIVITY

Reactivity
Containers may rupture or explode if exposed to heat.

Chemical Stability
Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions
Will not polymerize.

Conditions to Avoid
Protect from physical damage and heat. Containers may rupture or explode if exposed to heat. Avoid contact with water or moisture.

Incompatible Materials
combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases, potassium, sodium, ethyleneimine

Hazardous decomposition products
Oxides of carbon, Oxygen

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation
ringing in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma

Skin Contact
blisters, frostbite

Eye Contact
frostbite, blurred vision

Ingestion
frostbite

Acute and Chronic Toxicity

Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and no selected endpoints have been identified.

Product Toxicity Data

Acute Toxicity Estimate
No data available.

Immediate Effects

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Safety Data Sheet

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May cause cryogenic burns, frostbite

Delayed Effects
no information on significant adverse effects.

Irritation/Corrosivity Data
May cause cryogenic burns.

Respiratory Sensitization
No data available.

Dermal Sensitization
No data available.

Component Carcinogenicity
None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA.

Germ Cell Mutagenicity
No data available.

Tumorigenic Data
No data available.

Reproductive Toxicity
No data available.

Specific Target Organ Toxicity - Single Exposure
No target organs identified.

Specific Target Organ Toxicity - Repeated Exposure
No target organs identified.

Aspiration hazard
Not applicable.

Medical Conditions Aggravated by Exposure
heart or cardiovascular disorders, respiratory disorders

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity
No LOLI ecotoxicity data are available for this product's components.

Persistence and Degradability
No data available.

Bioaccumulative Potential
No data available.

Mobility
No data available.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations.

Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: CARBON DIOXIDE, REFRIGERATED LIQUID
Hazard Class: 2.2
UN/NA #: UN2187
Required Label(s): 2.2

IMDG Information:
## Section 15 - REGULATORY INFORMATION

### U.S. Federal Regulations
None of this product’s components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

### SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories
Gas Under Pressure; Simple Asphyxiant

### U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>124-38-9</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**
Not listed under California Proposition 65.

### Canada Regulations

#### Canadian WHMIS Ingredient Disclosure List (IDL)
Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>124-38-9</td>
<td></td>
</tr>
</tbody>
</table>

### Component Analysis - Inventory

**Carbon dioxide (124-38-9)**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Section 16 - OTHER INFORMATION

#### NFPA Ratings
Health: 3 Fire: 0 Instability: 0 Other: SA
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

#### Summary of Changes
Updated: 02/03/2017

#### Key / Legend
Safety Data Sheet

Material Name: CARBON DIOXIDE, LIQUID

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR’s Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL - Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH-Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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