## 3. Composition, Information on Ingredients

| | | |
|---|---|---|
| Substance/Mixture | : | Substance |
| Chemical Name | : | Carbon dioxide |
| Synonyms | : | Carbonic, Carbon Dioxide, Carbon Anhydride, CO2 |
| CAS Number | : | 124-38-9 |
| Content (vo%) | : | 99.5 % or more |

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

## 4. First Aid Measures

Description of necessary first aid measures

| | | |
|---|---|---|
| Inhalation | : | Remove exposed person to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular, or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Skin Contact | : | Carbon dioxide is harmless at atmospheric pressure.<br>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| Eye Contact | : | Carbon dioxide is harmless at atmospheric pressure.<br>Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs. |
| Ingestion | : | Since this product is a gas, refer to the inhalation section. |

Most important symptoms/effects, acute and delayed

Potential acute health effects

| | | |
|---|---|---|
| Inhalation | : | No known significant effects or critical hazards. |
| Skin Contact | : | No known significant effects or critical hazards. |
| Eye Contact | : | No known significant effects or critical hazards. |
| Frostbite | : | Try to warm up the frozen tissues and seek medical attention. |
| Ingestion | : | As this product is a gas, refer to the inhalation section. |

Over-exposure signs/symptoms

| | | |
|---|---|---|
| Inhalation | : | No specific data. |
| Skin Contact | : | No specific data. |
| Eye Contact | : | No specific data. |
| Ingestion | : | No specific data. |

Indication of immediate medical attention and special treatment needed, if necessary

| | | |
|---|---|---|
| Notes to physician | : | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| Specific treatments | : | No specific treatment. |
| Protection of first-aiders | : | No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. |

## 5. Fire Fighting Measures

Extinguishing media

| | | |
|---|---|---|
| Suitable extinguishing media | : | $CO_2$ is a non flammable gas. |
| Unsuitable extinguishing media | : | None known. |
| Specific hazards arising from the chemical | : | Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst. |
| Hazardous thermal decomposition products | : | Decomposition products may include the following materials:<br>Carbon dioxide<br>Carbon monoxide |
| Special protective actions for fire-fighters | : | Use water spray to keep fire-exposed containers cool.<br>Fire-fighters should wear appropriate equipment and self-contained breathing apparatus (SCBA). |

## 6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

| | | |
|---|---|---|
| For non-emergency personnel | : | No action shall be taken involving any personal risk or without suitable training. |
| For emergency responders | : | If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in “For non-emergency personnel”. |
| Environmental precautions | : | Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). |

Methods and materials for containment and cleaning up

| | | |
|---|---|---|
| Small spill | : | Stop leak if without risk. |

| | | |
|---|---|---|
| Large spill | : | Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal. |

## 7. Handling and Storage

| | |
|---|---|
| Precautions for safe handling<br>Protective measures | Contains gas under pressure. Avoid discharging cartridge into eyes, skin and clothing. Avoid breathing gas. Empty cartridges do not retain product residue. |
| Advice on general occupational hygiene | Do not inhale the contents of the cartridge |
| Conditions for safe storage, including any incompatibilities | Store away from a heat source. Do not heat over 160F(71C) |

## 8. Exposure Controls and Personal Protection

Control parameters

Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| Carbon Dioxide | ACGIH TLV (United States, 3/2012). Oxygen Depletion [Asphyxiant].<br>STEL: 54000 mg/m$^3$ 15 minutes.<br>STEL: 30000 ppm 15 minutes.<br>TWA: 9000 mg/m$^3$ 8 hours<br>TWA: 5000 ppm 8 hours.<br>NIOSH REL (United States, 1/2013).<br>STEL: 54000 mg/m$^3$ 15 minutes.<br>STEL: 30000 ppm 15 minutes.<br>TWA: 9000 mg/m$^3$ 8 hours<br>TWA: 5000 ppm 8 hours.<br>OSHA PEL (United States, 6/2010).<br>TWA: 9000 mg/m$^3$ 8 hours<br>TWA: 5000 ppm 8 hours.<br>OSHA PEL 1989 (United States, 3/1989).<br>STEL: 54000 mg/m$^3$ 15 minutes. |

| | |
|---|---|
| | STEL: 30000 ppm 15 minutes.<br>TWA: 9000 mg/m$^3$ 8 hours<br>TWA: 5000 ppm 8 hours. |

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure control

Individual protection measures

Hygiene measures : Do not spray CO2 on skin or inhale directly.

Eye/Face protection : Safety eyewear should be used when dispensing a cartridge.

Skin protection : Do not touch a cartridge when discharging as it may cause frost burns, wear a glove to protect.

Hand protection : Gloves when touching a cold discharged cartridge.

Body protection : None

Other skin protection : None

Respiratory protection : None

## 9. Physical and Chemical Properties

Appearance

| | | |
|---|---|---|
| Physical state | : | Gas at normal temperature and pressure |
| Color | : | Colorless |
| Molecular weight | : | 44.01 g/mol |
| Molecular formula | : | $C\text{-}O_2$ |
| Melting/freezing point | : | Sublimation temperature: -79C (-110.2F) |
| Critical temperature | : | 30.85C (87.5F) |
| Odor | : | Odorless |
| Odor threshold | : | Not available. |
| pH | : | Not available. |
| Flash point | : | [Product does not sustain combustion.] |
| Burning time | : | Not applicable. |
| Burning rate | : | Not applicable. |
| Evaporation rate | : | Not available. |
| Flammability (solid, gas) | : | Not available. |
| Lower and upper explosive (flammable) limits | : | Not available. |
| Vapor pressure | : | 830 psig at 70F |
| Vapor density | : | 1.53 (Air = 1), Liquid Density@BP: Solid Density = 97.5 lb/ft$^3$ (1562 kg/m$^3$) |
| Specific Volume | : | 8.7719 ft$^3$/lb ( m$^3$/g) |
| Gas Density | : | 0.114 lb/ft$^3$ (178.6 g/m$^3$) |
| Relative density | : | Not applicable. |
| Solubility | : | Not available. |
| Solubility in Water | : | Not available. |
| Partition coefficient: n-octanol/water | : | 0.83 |
| Auto-ignition temperature | : | Not available. |
| Decomposition temperature | : | Not available. |
| SADT | : | Not available. |
| Viscosity | : | Not applicable. |

## 10. Stability and Reactivity

| | | |
|---|---|---|
| Reactivity | : | No specific test data related to reactivity is available for this product or its ingredients. |
| Chemical stability | : | The product is stable. |
| Possibility of hazardous reactions | : | Under normal conditions of storage and use, hazardous reactions will not occur. |
| Conditions to avoid | : | No specific data. |
| Hazardous decomposition products | : | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| Hazardous polymerization | : | Under normal conditions of storage and use, hazardous polymerization will not occur. |

## 11. Toxicological Information

Information on toxicological effects

| | | |
|---|---|---|
| Acute toxicity | : | Not available. |
| Irritation / Corrosion | : | Not available. |
| Sensitization | : | Not available. |
| Mutagenicity | : | Not available. |
| Carcinogenicity | : | Not available. |
| Reproductive toxicity | : | Not available. |
| Teratogenicity | : | Not available. |
| Specific target organ toxicity (single exposure) | : | Not available. |
| Specific target organ toxicity (repeated exposure) | : | Not available. |
| Aspiration hazard | : | Not available. |
| Information on the likely routes of exposure | : | Not available. |

Potential acute health effects

| | | |
|---|---|---|
| Eye contact | : | No known significant effects or critical hazards. |
| Inhalation | : | No known significant effects or critical hazards. |
| Skin contact | : | No known significant effects or critical hazards. |
| Ingestion | : | Since this product is a gas, refer to the inhalation section. |

Symptoms related to the physical, chemical and toxicological characteristics

| | | |
|---|---|---|
| Eye contact | : | No specific data. |
| Inhalation | : | No specific data. |
| Skin contact | : | No specific data. |
| ingestion | : | No specific data. |

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

| | | |
|---|---|---|
| Potential immediate effects | : | Not available. |
| Potential delayed effects | : | Not available. |

Long term exposure

| | | |
|---|---|---|
| Potential immediate effects | : | Not available. |
| Potential delayed effects | : | Not available. |

Potential chronic health effects – Not available.

| | | |
|---|---|---|
| General | : | No known significant effects or critical hazards. |
| Carcinogenicity | : | No known significant effects or critical hazards. |
| Mutagenicity | : | No known significant effects or critical hazards. |
| Teratogenicity | : | No known significant effects or critical hazards. |
| Developmental effects | | No known significant effects or critical hazards. |
| Fertility effects | | No known significant effects or critical hazards. |

Numerical measures of toxicity

| | | |
|---|---|---|
| Acute toxicity estimates | : | Not available. |

## 12. Ecological Information

Not available.

Bioaccumulative potential

| Product/Ingredient name | Log $P_{ow}$ | BCF | Potential |
|---|---|---|---|
| Carbon Dioxide | 0.83 | - | low |

Mobility is soil Soil/Water partition coefficient ($K_{OC}$) Other adverse effects

No known significant effects or critical hazards.

## 13. Disposal Considerations

Discharge of Carbon Dioxide: Gradually release in open air.

Disposal of Cylinders and Cartridges: Cartridges with a puncture hole are considered empty and may be recycled. Larger cylinders with an integrated valve; use a device to empty and recycle. Do not dispose of or recycle cylinders without first checking that all gas has been released.

## 14. Transport Information for Leland 89 and 99 Series Large Cylinders >114ml water capacity

DOT/IMDG Shipping Name : Carbon Dioxide

UN Number : UN 1013

Hazard Class (Division) : 2 (2.2)

Placard (When required) : Nonflammable gas


Special Shipping Information : See CFR 49, 172.101,

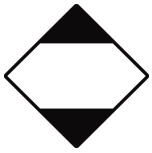
## 14.A Transport Information for Leland puncture type Cartridges < 114ml water capacity

DOT Shipping Name: : Limited Quantity (Authorized per 49CFR 173.306)

UN Number : Not Applicable (Excepted per 49CFR 173.306

Hazard Class : Not Applicable

Carton Marking :



Special Notes Regarding Transportation:

All CO2 filled cartridges less than 114 ml of water capacity offered for ground transportation qualify for the exceptions provided in 49CFR 173.306 so that the proper shipping name of "Limited Quantity" may be used for shipping papers and carton identification labels.

All Leland product drawings indicate the cartridge or cylinder internal water volume.

IATA/IACO/FedEx/UPS each have their own unique requirements regarding transportation of CO2 filled cartridges of less than 114ml of water capacity. With a few limited exceptions, cartridges filled with CO2 less than 114ml of water capacity need to be offered as Caron Dioxide UN1013.

49CFR requires that employers shall provide specific training/certification for employees who handle and offer Dangerous Goods for any mode of transportation.

## 15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

| | | | | |
|---|---|---|---|---|
| U.S. Federal Regulations | : | None of this products 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 311/312 Hazardous Categories | : | Fire hazard | : | No |
| | | Sudden release of pressure | : | Yes |
| | | Reactive | : | No |
| | | Immediate (acute) health hazard | : | No |
| | | Delayed (chronic) health hazard | : | No |
| State Regulations | : | Massachusetts | : | This material is listed. |
| | | New York | : | This material is not listed. |
| | | New Jersey | : | This material is listed. |
| | | Pennsylvania | : | This material is listed. |
| | | California | : | This material is listed. Not regulated under CA Proposition 65. |
| International Regulations | : | Canada inventory | | This material is listed or exempted. |
| | | Australia inventory (AICS) | | This material is listed or exempted. |
| | | China inventory (IECSC) | | This material is listed or exempted. |
| | | Japan inventory | | This material is listed or exempted. |
| | | Korea inventory | | This material is listed or exempted. |
| | | Malaysia inventory (EHS Register) | | Not determined. |
| | | New Zealand inventory of Chemicals (NZIoC) | | This material is listed or exempted. |
| | | Philippines inventory (PICCS) | | This material is listed or exempted. |
| | | Taiwan inventory (CSNN) | | Not determined. |

## 16. Other Information

| | | | |
|---|---|---|---|
| Hazard Rating Systems | : | **NFPA Ratings** | **HMIS Ratings** |
| | | Health = 2 | Health = 1 |
| | | Flammability = 0 | Flammability = 0 |
| | | Reactivity = 0 | Physical hazards = 3 |
| | | Special = SA | |

Key to abbreviations

| | | |
|---|---|---|
| ACGIH | : | American Conference of Governmental Industrial Hygienists |
| BCF | : | Bioconcentration Factor |
| CAS | : | Chemical Abstract Services |

| | | |
|---|---|---|
| CERCLA | : | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | : | United States Code of Federal Regulations |
| DOT | : | Department of Transportation |
| GHS | : | Globally Harmonized System of Classification and Labeling of Chemicals |
| IATA | : | International Air Transport Association |
| IMDG | : | International Maritime Dangerous Goods |
| IMO | : | International Maritime Organization |
| Log $P_{ow}$ | : | Logarithm of the octanol/water partition coefficient |
| NIOSH | : | National Institute for Occupational Safety and Health |
| OSHA | : | Occupational Safety and Health Administration |
| STEL | : | Short-term Exposure Limit |
| SARA | : | Superfund Amendments and Reauthorization Act |
| TLV | : | Threshold Limit Value |
| TSCA | : | Toxic Substances Control Act |
| TWA | : | Time Weighted Average |

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