SAFETY DATA SHEET
Carbon Dioxide, Solid or Dry Ice

Section 1. Identification

GHS product identifier : Carbon Dioxide, Solid or Dry Ice
Chemical name : Carbon dioxide, solid
Other means of identification : Dry ice; carbonic anhydride
Product type : Solid.
Product use : Synthetic/Analytical chemistry.
Synonym : Dry ice; carbonic anhydride
SDS # : 001091
Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : Not classified.
Classification of the substance or mixture : Not classified by Globally Harmonized System of Classification and Labeling (GHS).

GHS label elements
Signal word : No signal word.
Hazard statements : May displace oxygen and cause rapid suffocation. May increase respiration and heart rate. May cause frostbite. May increase respiration and heart rate.

Precautionary statements
General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
Prevention : Not applicable.
Response : Not applicable.
Disposal : Not applicable.
Hazards not otherwise classified : Contact with cryogenic liquid can cause frostbite and cryogenic burns.

None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : Carbon dioxide, solid
Other means of identification : Dry ice; carbonic anhydride
Product code : 001091

CAS number/other identifiers
CAS number : 124-38-9

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>100</td>
<td>124-38-9</td>
</tr>
</tbody>
</table>

Date of issue/Date of revision : 10/25/2021
Date of previous issue : 11/10/2018
Version : 1.01
## Section 3. Composition/information on ingredients

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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.

## Section 4. First aid measures

### Description of necessary first aid measures

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye contact</strong></td>
<td>Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.</td>
</tr>
<tr>
<td><strong>Inhalation</strong></td>
<td>Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.</td>
</tr>
<tr>
<td><strong>Skin contact</strong></td>
<td>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.</td>
</tr>
<tr>
<td><strong>Ingestion</strong></td>
<td>Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.</td>
</tr>
</tbody>
</table>

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye contact</strong></td>
<td>May cause eye irritation.</td>
</tr>
<tr>
<td><strong>Inhalation</strong></td>
<td>May be harmful if inhaled. May cause respiratory irritation.</td>
</tr>
<tr>
<td><strong>Skin contact</strong></td>
<td>Harmful if absorbed through the skin. May cause skin irritation.</td>
</tr>
<tr>
<td><strong>Frostbite</strong></td>
<td>Try to warm up the frozen tissues and seek medical attention.</td>
</tr>
<tr>
<td><strong>Ingestion</strong></td>
<td>May be harmful if swallowed and enters airways.</td>
</tr>
</tbody>
</table>

#### Over-exposure signs/symptoms

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye contact</strong></td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Inhalation</strong></td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Skin contact</strong></td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Ingestion</strong></td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

### 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.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suitable extinguishing media</strong></td>
<td>Use an extinguishing agent suitable for the surrounding fire.</td>
</tr>
<tr>
<td><strong>Unsuitable extinguishing media</strong></td>
<td>None known.</td>
</tr>
</tbody>
</table>

**Specific hazards arising from the chemical**: No specific fire or explosion hazard.
### Section 5. Fire-fighting measures

**Hazardous thermal decomposition products**: Decomposition products may include the following materials:
- Carbon dioxide
- Carbon monoxide

**Special protective actions for fire-fighters**: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters**: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

### Section 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. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

**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**: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. 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**: Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

**Large spill**: Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

### Section 7. Handling and storage

**Precautions for safe handling**

**Protective measures**: Put on appropriate personal protective equipment (see Section 8).

**Advice on general occupational hygiene**: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities**: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
Section 8. Exposure controls/personal protection

Control parameters

### Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
</table>
| Carbon Dioxide  | ACGIH TLV (United States, 3/2019).  
                  | STEL: 54000 mg/m³ 15 minutes.  
                  | STEL: 30000 ppm 15 minutes.  
                  | TWA: 9000 mg/m³ 8 hours.  
                  | TWA: 5000 ppm 8 hours.  
                  | NIOSH REL (United States, 10/2016).  
                  | STEL: 54000 mg/m³ 15 minutes.  
                  | STEL: 30000 ppm 15 minutes.  
                  | TWA: 9000 mg/m³ 10 hours.  
                  | TWA: 5000 ppm 10 hours.  
                  | OSHA PEL (United States, 5/2018).  
                  | TWA: 9000 mg/m³ 8 hours.  
                  | TWA: 5000 ppm 8 hours.  
                  | STEL: 54000 mg/m³ 15 minutes.  
                  | STEL: 30000 ppm 15 minutes.  
                  | TWA: 18000 mg/m³ 8 hours.  
                  | TWA: 10000 ppm 8 hours.  |

### Appropriate engineering controls

- Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

### Environmental exposure controls

- Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

#### Hygiene measures

- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.
- Appropriate techniques should be used to remove potentially contaminated clothing.
- Wash contaminated clothing before reusing.
- Ensure that eyewash stations and safety showers are close to the workstation location.

#### Eye/face protection

- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

#### Skin protection

##### Hand protection

- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

##### Body protection

- Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

##### Other skin protection

- Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

##### Respiratory protection

- Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.
## Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td></td>
</tr>
<tr>
<td>Physical state</td>
<td>Solid, [WHITE SNOW-LIKE SOLID]</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Not available</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting point</td>
<td>Sublimation temperature: -78.5°C (-109.3°F)</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Not available</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>31°C (87.8°F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower and upper explosive limits</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Specific Volume (ft (^3)/lb)</strong></td>
<td>0.6579</td>
</tr>
<tr>
<td><strong>Gas Density (lb/ft (^3))</strong></td>
<td>1.52</td>
</tr>
<tr>
<td>Relative density</td>
<td>Density Solid (Dry Ice) 97.5189 lb./ft.3 at -109.3°F</td>
</tr>
<tr>
<td>Solubility</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Not available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Flow time (ISO 2431)</td>
<td>Not available</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>44.01 g/mole</td>
</tr>
</tbody>
</table>

## Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reactivity</strong></td>
<td>No specific test data related to reactivity available for this product or its ingredients.</td>
</tr>
<tr>
<td><strong>Chemical stability</strong></td>
<td>The product is stable.</td>
</tr>
<tr>
<td><strong>Possibility of hazardous reactions</strong></td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
</tr>
<tr>
<td><strong>Conditions to avoid</strong></td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Incompatible materials</strong></td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Hazardous decomposition products</strong></td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
</tr>
<tr>
<td><strong>Hazardous polymerization</strong></td>
<td>Under normal conditions of storage and use, hazardous polymerization will not occur.</td>
</tr>
</tbody>
</table>

**Date of issue/Date of revision**: 10/25/2021  
**Date of previous issue**: 11/10/2018  
**Version**: 1.01
Section 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**
May cause eye irritation.

**Inhalation**
May be harmful if inhaled. May cause respiratory irritation.

**Skin contact**
Harmful if absorbed through the skin. May cause skin irritation.

**Ingestion**
May be harmful if swallowed and enters airways.

**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**

: Not available.

**Potential delayed effects**
: Not available.

**Long term exposure**

: Not available.

**Potential chronic health effects**

: Not available.
Section 11. Toxicological information

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.

Section 12. Ecological information

**Toxicity**
- Not available.

**Persistence and degradability**
- Not available.

**Bioaccumulative potential**
- Not available.

**Mobility in soil**
- **Soil/water partition coefficient ($K_{oc}$)**
  - Not available.

**Other adverse effects**
- No known significant effects or critical hazards.

Section 13. Disposal considerations

**Disposal methods**
- The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information
## Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT Classification</th>
<th>TDG Classification</th>
<th>Mexico Classification</th>
<th>IMDG Classification</th>
<th>IATA Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN1845</td>
<td>UN1845</td>
<td>UN1845</td>
<td>UN1845</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>CARBON DIOXIDE, SOLID OR DRY ICE</td>
<td>CARBON DIOXIDE, SOLID OR DRY ICE</td>
<td>CARBON DIOXIDE, SOLID OR DRY ICE</td>
<td>CARBON DIOXIDE, SOLID (DRY ICE)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

### Additional information

- **DOT Classification**: Limited quantity Yes. Quantity limitation Passenger aircraft/rail: 200 kg. Cargo aircraft: 200 kg.
- **TDG Classification**: Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9). Explosive Limit and Limited Quantity Index 5 Passenger Carrying Vessel Index 200 Special provisions 18
- **IATA**: Quantity limitation Passenger and Cargo Aircraft: 200 kg. Cargo Aircraft Only: 200 kg.

### Special precautions for user

- Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

### Transport in bulk according to IMO instruments

Not available.

## Section 15. Regulatory information

- **U.S. Federal regulations**
  - TSCA 8(a) CDR Exempt/Partial exemption: This material is listed or exempted.
  - Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Not listed
  - Clean Air Act Section 602 Class I Substances: Not listed
  - Clean Air Act Section 602 Class II Substances: Not listed
  - DEA List I Chemicals (Precursor Chemicals): Not listed
  - DEA List II Chemicals (Essential Chemicals): Not listed
  - SARA 302/304
    - Composition/information on ingredients
      - No products were found.
Section 15. Regulatory information

**SARA 304 RQ**
- Not applicable.

**SARA 311/312**
- Classification: Refer to Section 2: Hazards Identification of this SDS for classification of substance.

**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 Prop. 65**

This product does not require a Safe Harbor warning under California Prop. 65.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**
- Not listed.

**Montreal Protocol**
- Not listed.

**Stockholm Convention on Persistent Organic Pollutants**
- Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**
- Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**
- Not listed.

**Inventory list**

- **Australia**: This material is listed or exempted.
- **Canada**: This material is listed or exempted.
- **China**: This material is listed or exempted.
- **Europe**: This material is listed or exempted.
- **Japan**: Japan inventory (ENCS): This material is listed or exempted. Japan inventory (ISHL): This material is listed or exempted.
- **New Zealand**: This material is listed or exempted.
- **Philippines**: This material is listed or exempted.
- **Republic of Korea**: This material is listed or exempted.
- **Taiwan**: This material is listed or exempted.
- **Thailand**: Not determined.
- **Turkey**: This material is listed or exempted.
- **United States**: This material is active or exempted.
- **Viet Nam**: This material is listed or exempted.

Section 16. Other information

**Hazardous Material Information System (U.S.A.)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>3</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
</tr>
<tr>
<td>Physical hazards</td>
<td>0</td>
</tr>
</tbody>
</table>
Carbon Dioxide, Solid or Dry Ice

Section 16. Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

**National Fire Protection Association (U.S.A.)**

![HMIS Rating]

- **Flammability**: 0
- **Health**: 3
- **Instability/Reactivity**: 0
- **Special**: SA

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

**Procedure used to derive the classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not classified.</td>
<td></td>
</tr>
</tbody>
</table>

**History**

- **Date of printing**: 10/25/2021
- **Date of issue/Date of revision**: 10/25/2021
- **Date of previous issue**: 11/10/2018
- **Version**: 1.01

**Key to abbreviations**

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- UN = United Nations

**References**

- Not available.

**Notice to reader**

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.