SAFETY DATA SHEET
Ethylene Oxide

Section 1. Identification

<table>
<thead>
<tr>
<th>GHS product identifier</th>
<th>: Ethylene Oxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical name</td>
<td>: ethylene oxide</td>
</tr>
<tr>
<td>Other means of</td>
<td>: oxirane; Oxirane (ethylene oxide)</td>
</tr>
<tr>
<td>identification</td>
<td></td>
</tr>
<tr>
<td>Product use</td>
<td>: Synthetic/Analytical chemistry.</td>
</tr>
<tr>
<td>Synonym</td>
<td>: oxirane; Oxirane (ethylene oxide)</td>
</tr>
<tr>
<td>SDS #</td>
<td>: 001081</td>
</tr>
<tr>
<td>Supplier's details</td>
<td>: Airgas USA, LLC and its affiliates</td>
</tr>
<tr>
<td></td>
<td>259 North Radnor-Chester Road</td>
</tr>
<tr>
<td></td>
<td>Suite 100</td>
</tr>
<tr>
<td></td>
<td>Radnor, PA 19087-5283</td>
</tr>
<tr>
<td></td>
<td>1-610-687-5253</td>
</tr>
<tr>
<td>24-hour telephone</td>
<td>: 1-866-734-3438</td>
</tr>
</tbody>
</table>

Section 2. Hazards identification

<table>
<thead>
<tr>
<th>OSHA/HCS status</th>
<th>: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of the</td>
<td>: FLAMMABLE GASES - Category 1</td>
</tr>
<tr>
<td>substance or mixture</td>
<td>GASES UNDER PRESSURE - Liquefied gas</td>
</tr>
<tr>
<td></td>
<td>ACUTE TOXICITY (inhalation) - Category 3</td>
</tr>
<tr>
<td></td>
<td>SKIN CORROSION/IRRITATION - Category 2</td>
</tr>
<tr>
<td></td>
<td>SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A</td>
</tr>
<tr>
<td></td>
<td>GERM CELL MUTAGENICITY - Category 1B</td>
</tr>
<tr>
<td></td>
<td>CARCINOGENICITY - Category 1B</td>
</tr>
<tr>
<td></td>
<td>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GHS label elements</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard pictograms</td>
<td>:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signal word</th>
<th>: Danger</th>
</tr>
</thead>
</table>

Precautionary statements

| General                 | : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution. |

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Date of previous issue : 9/29/2016
Version : 0.02
Section 2. Hazards identification

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. Avoid breathing gas. Wash hands thoroughly after handling.

Response: IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage: Store locked up. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified: Liquid can cause burns similar to frostbite.

Section 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Substance/mixture</th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical name</td>
<td>ethylene oxide</td>
</tr>
<tr>
<td>Other means of identification</td>
<td>oxirane; Oxirane (ethylene oxide)</td>
</tr>
</tbody>
</table>

CAS number/other identifiers

- CAS number: 75-21-8
- Product code: 001081

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>100</td>
<td>75-21-8</td>
</tr>
</tbody>
</table>

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

Eye contact: 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.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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 necessary, call a poison center or physician. 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: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Continue to rinse for at least 10 minutes. Get medical attention. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Section 4. First aid measures

Ingestion: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. 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. As this product rapidly becomes a gas when released, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact: Causes serious eye irritation. Liquid can cause burns similar to frostbite.
Inhalation: Toxic if inhaled. May cause respiratory irritation.
Skin contact: Causes skin irritation. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Frostbite: Try to warm up the frozen tissues and seek medical attention.
Ingestion: Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following: pain or irritation, watering, redness, frostbite
Inhalation: Adverse symptoms may include the following: respiratory tract irritation, coughing
Skin contact: Adverse symptoms may include the following: irritation, redness, frostbite
Ingestion: Adverse symptoms may include the following: frostbite

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. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Gas may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back, causing fire or explosion.

Hazardous thermal decomposition products: Decomposition products may include the following materials: carbon dioxide carbon monoxide
Section 5. Fire-fighting measures

**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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

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. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

Section 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

For non-emergency personnel: Accidental releases pose a serious fire or explosion hazard. 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. Shut off all ignition sources. No flames, smoking or flames in hazard area. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised 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. 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: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. 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). Contains gas under pressure. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

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.
Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities
Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>ACGIH TLV (United States, 3/2015). TWA: 1.8 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 1 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 10/2013). CEIL: 9 mg/m³ 10 minutes.</td>
</tr>
<tr>
<td></td>
<td>CEIL: 5 ppm 10 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 0.18 mg/m³ 10 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 0.1 ppm 10 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013). STEL: 5 ppm 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 1 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 1 ppm 8 hours.</td>
</tr>
</tbody>
</table>

Appropriate engineering controls
Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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: chemical splash goggles.

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. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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Date of previous issue: 9/29/2016
Version: 0.02
5/13
Section 8. Exposure controls/personal protection

**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. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

**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**
- Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

**Appearance**

**Physical state**
- Gas. [Liquefied compressed gas.]

**Color**
- Colorless.

**Molecular weight**
- 44.06 g/mole

**Molecular formula**
- C2-H4-O

**Boiling/condensation point**
- 107°C (51.3°F)

**Melting/freezing point**
- -111.7°C (-169.1°F)

**Critical temperature**
- 195.85°C (384.5°F)

**Odor**
- Characteristic.

**Odor threshold**
- Not available.

**pH**
- Not available.

**Flash point**
- Closed cup: -29°C (-20.2°F)
  - Open cup: -29.15°C (-20.5°F)

**Burning time**
- Not applicable.

**Burning rate**
- Not applicable.

**Evaporation rate**
- 109.5 (butyl acetate = 1)

**Flammability (solid, gas)**
- Not applicable.

**Lower and upper explosive (flammable) limits**
- Lower: 3%
  - Upper: 100%

**Vapor pressure**
- 22 (psia)

**Vapor density**
- 1.5 (Air = 1)

**Specific Volume (ft³/lb)**
- 8.7719

**Gas Density (lb/ft³)**
- 0.114

**Relative density**
- Not applicable.

**Solubility**
- Not available.

**Solubility in water**
- Not available.

**Partition coefficient: n-octanol/water**
- -0.3

**Auto-ignition temperature**
- 429°C (804.2°F)

**Decomposition temperature**
- Not available.

**SADT**
- Not available.

**Viscosity**
- Not applicable.
Section 10. Stability and reactivity

Reactivity: No specific test data related to reactivity 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: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow gas to accumulate in low or confined areas.

Incompatible materials: Oxidizers

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.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>LC50 Inhalation Gas.</td>
<td>Rat</td>
<td>800 ppm</td>
<td>4 hours</td>
</tr>
</tbody>
</table>

IDLH: 800 ppm

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>6 hours 18 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensitization
Not available.

Mutagenicity
Not available.

Carcinogenicity
Not available.

Classification

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>+</td>
<td>1</td>
<td>Known to be a human carcinogen.</td>
</tr>
</tbody>
</table>

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)
**Section 11. Toxicological information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Respiratory tract irritation</td>
</tr>
</tbody>
</table>

**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**: Causes serious eye irritation. Liquid can cause burns similar to frostbite.
- **Inhalation**: Toxic if inhaled. May cause respiratory irritation.
- **Skin contact**: Causes skin irritation. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
- **Ingestion**: Ingestion of liquid can cause burns similar to frostbite.

**Symptoms related to the physical, chemical and toxicological characteristics**

- **Eye contact**: Adverse symptoms may include the following: pain or irritation, watering, redness, frostbite
- **Inhalation**: Adverse symptoms may include the following: respiratory tract irritation, coughing
- **Skin contact**: Adverse symptoms may include the following: irritation, redness, frostbite
- **Ingestion**: Adverse symptoms may include the following: frostbite

**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**: May cause cancer. Risk of cancer depends on duration and level of exposure.
- **Mutagenicity**: May cause genetic defects.
- **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**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
</table>
| ethylene oxide          | Acute LC50 490000 µg/l Marine water  
Acute LC50 300000 µg/l Fresh water  
Acute LC50 84000 to 96000 µg/l Fresh water | Crustaceans - Artemia sp.  
Daphnia - Daphnia magna  
Fish - Pimephales promelas | 48 hours  
48 hours  
96 hours |

**Persistence and degradability**

Not available.

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>-0.3</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

Soil/water partition coefficient (K<sub>oc</sub>) : 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. Empty Airgas-owned pressure vessels should be returned to Airgas. 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. Do not puncture or incinerate container.

**United States - RCRA Toxic hazardous waste "U" List**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>Status</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene oxide (I,T); Oxirane (I,T)</td>
<td>75-21-8</td>
<td>Listed</td>
<td>U115</td>
</tr>
</tbody>
</table>

**Section 14. Transport information**

<table>
<thead>
<tr>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN1040</td>
<td>UN1040</td>
<td>UN1040</td>
<td>UN1040</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>Ethylene Oxide</td>
<td>Ethylene Oxide</td>
<td>Ethylene Oxide</td>
<td>ETHYLENE OXIDE</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>2.3 (2.1)</td>
<td>2.3 (2.1)</td>
<td>2.3 (2.1)</td>
<td>2.3 (2.1)</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
**Section 14. Transport information**

**Additional information**

<table>
<thead>
<tr>
<th>Reportable quantity</th>
<th>Toxic - Inhalation hazard Zone C</th>
<th>Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.13-2.17 (Class 2).</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 lbs / 4.54 kg</td>
<td>0</td>
<td><strong>Explosive Limit and Limited Quantity Index</strong></td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>ERAP Index</strong></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Passenger Carrying Ship Index</strong></td>
<td>Forbidden</td>
<td>Forbidden</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Passenger Carrying Road or Rail Index</strong></td>
<td>Forbidden</td>
<td>Forbidden</td>
</tr>
</tbody>
</table>

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

**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 Annex II of MARPOL 73/78 and the IBC Code: Not available.

**Section 15. Regulatory information**

**U.S. Federal regulations**

Clean Air Act (CAA) 112 regulated toxic substances: ethylene oxide

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): 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

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>EHS</th>
<th>SARA 302 TPQ (lbs)</th>
<th>SARA 304 RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>100</td>
<td>Yes.</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td>SARA 304 RQ</td>
<td>10 lbs / 4.5 kg</td>
<td>Yes.</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>SARA 311/312</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Date of issue/Date of revision**: 9/30/2016

**Date of previous issue**: 9/29/2016

**Version**: 0.02
Section 15. Regulatory information

Classification : Fire hazard
                 Sudden release of pressure
                 Immediate (acute) health hazard
                 Delayed (chronic) health hazard

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>100</td>
<td>Yes.</td>
<td>Yes.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

SARA 313

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form R - Reporting requirements</td>
<td>ethylene oxide</td>
<td>75-21-8</td>
</tr>
<tr>
<td>Supplier notification</td>
<td>ethylene oxide</td>
<td>75-21-8</td>
</tr>
</tbody>
</table>

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.
New York : This material is listed.
New Jersey : This material is listed.
Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene oxide</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

International regulations

Rotterdam Convention on Prior Inform Consent (PIC)

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>List name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene oxide (ISO); Amprolene; Oxirane; 1, 2-Epoxyethane; EO</td>
<td>INTL - Rotterdam Convention on Prior Inform Consent (PIC)</td>
<td>Pesticide</td>
</tr>
</tbody>
</table>

International lists

National inventory

<table>
<thead>
<tr>
<th>Country</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Canada</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>China</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Europe</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Japan</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>New Zealand</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Philippines</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Taiwan</td>
<td>This material is listed or exempted.</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
</tr>
</tbody>
</table>

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### Section 15. Regulatory information

**WHMIS (Canada)**
- Class A: Compressed gas.
- Class B-1: Flammable gas.
- Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
- Class D-2A: Material causing other toxic effects (Very toxic).
- Class E: Corrosive material
- Class F: Dangerously reactive material.

**CEPA Toxic substances**: This material is listed.
**Canadian ARET**: This material is not listed.
**Canadian NPRI**: This material is listed.
**Alberta Designated Substances**: This material is not listed.
**Ontario Designated Substances**: This material is not listed.
**Quebec Designated Substances**: This material is not listed.

### Section 16. Other information

**Canada Label requirements**
- Class A: Compressed gas.
- Class B-1: Flammable gas.
- Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
- Class D-2A: Material causing other toxic effects (Very toxic).
- Class E: Corrosive material
- Class F: Dangerously reactive material.

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

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

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 are not required on SDSs under 29 CFR 1910.

The customer is responsible for determining the PPE code for this material.

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

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Instability/Reactivity</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

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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**
Section 16. Other information

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flam. Gas 1, H220</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Acute Tox. 3, H331</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Skin Irrit. 2, H315</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Eye Irrit. 2A, H319</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Muta. 1B, H340</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Carc. 1B, H350</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>STOT SE 3, H335</td>
<td>Expert judgment</td>
</tr>
</tbody>
</table>

History

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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.

Indicates information that has changed from previously issued version.

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.