# SAFETY DATA SHEET

Flammable Liquefied Gas Mixture: 1-Butanol / 2-Butanol / Acetone / Dimethyl Ether / Ethanol / Ethyl Tert Butyl Ether / Isobutanol / Isopropyl Alcohol / Methanol / Methyl Ethyl Ketone / Methyl Tert Butyl Ether / N-Butane / N-Propanol / Sec-Butyl Methyl Ether / Tert-Amyl Methyl Ether / Tert Butanol

## Section 1. Identification

**GHS product identifier** : Flammable Liquefied Gas Mixture: 1-Butanol / 2-Butanol / Acetone / Dimethyl Ether / Ethanol / Ethyl Tert Butyl Ether / Isobutanol / Isopropyl Alcohol / Methanol / Methyl Ethyl Ketone / Methyl Tert Butyl Ether / N-Butane / N-Propanol / Sec-Butyl Methyl Ether / Tert-Amyl Methyl Ether / Tert Butanol

**Other means of identification** : Not available.

**Product use** : Synthetic/Analytical chemistry.

**SDS #** : 018425

**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** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

**GHS label elements**

**Hazard pictograms** :

**Signal word** : Danger

**Hazard statements** : Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May cause frostbite.
May form explosive mixtures in Air.

**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.

**Prevention** : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

**Response** : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

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

**Disposal** : Not applicable.

# Section 2. Hazards identification

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

# Section 3. Composition/information on ingredients

**Substance/mixture** : Mixture

**Other means of identification** : Not available.

## CAS number/other identifiers

**CAS number** : Not applicable.

**Product code** : 018425

| Ingredient name | % | CAS number |
|---|---|---|
| N-Butane | 98 - 99 | 106-97-8 |
| butan-2-ol | 0.0001 - 0.0999 | 78-92-2 |
| n-butyl alcohol | 0.0001 - 0.0999 | 71-36-3 |
| tert butanol | 0.0001 - 0.0999 | 75-65-0 |
| tert Amyl Methyl Ether | 0.0001 - 0.0999 | 994-05-8 |
| sec-butyl methyl ether | 0.0001 - 0.0999 | 6795-87-5 |
| propan-1-ol | 0.0001 - 0.0999 | 71-23-8 |
| tert-butyl methyl ether | 0.0001 - 0.0999 | 1634-04-4 |
| Methyl Ethyl Ketone | 0.0001 - 0.0999 | 78-93-3 |
| methanol | 0.0001 - 0.0999 | 67-56-1 |
| propan-2-ol | 0.0001 - 0.0999 | 67-63-0 |
| Isobutyl Alcohol | 0.0001 - 0.0999 | 78-83-1 |
| 2-ethoxy-2-methylpropane | 0.0001 - 0.0999 | 637-92-3 |
| ethanol | 0.0001 - 0.0999 | 64-17-5 |
| dimethyl ether | 0.0001 - 0.0999 | 115-10-6 |
| acetone | 0.0001 - 0.0999 | 67-64-1 |

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 if irritation occurs.

**Inhalation** : Remove victim 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** : 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. Get medical attention if symptoms occur. 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 if adverse health effects persist or are severe. 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** : Liquid can cause burns similar to frostbite.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : 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:, frostbite

**Inhalation** : No specific data.

**Skin contact** : Adverse symptoms may include the following:, 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. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**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.

**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. 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.

# Section 5. Fire-fighting measures

**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 flares, smoking or flames in hazard area. Avoid breathing 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. Do not get in eyes or on skin or clothing. Avoid breathing 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.

**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). 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

| Ingredient name | Exposure limits |
|---|---|
| N-Butane | **NIOSH REL (United States, 10/2013).**<br>TWA: 1900 mg/m³ 10 hours.<br>TWA: 800 ppm 10 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 1900 mg/m³ 8 hours.<br>TWA: 800 ppm 8 hours.<br>**ACGIH TLV (United States, 3/2015).**<br>STEL: 1000 ppm 15 minutes. |
| butan-2-ol | **ACGIH TLV (United States, 3/2016).**<br>TWA: 303 mg/m³ 8 hours.<br>TWA: 100 ppm 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>STEL: 455 mg/m³ 15 minutes.<br>STEL: 150 ppm 15 minutes.<br>TWA: 305 mg/m³ 10 hours.<br>TWA: 100 ppm 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 450 mg/m³ 8 hours.<br>TWA: 150 ppm 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 305 mg/m³ 8 hours.<br>TWA: 100 ppm 8 hours. |
| n-butyl alcohol | **ACGIH TLV (United States, 3/2016).**<br>TWA: 20 ppm 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>**Absorbed through skin.**<br>CEIL: 150 mg/m³<br>CEIL: 50 ppm<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 300 mg/m³ 8 hours.<br>TWA: 100 ppm 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>**Absorbed through skin.**<br>CEIL: 150 mg/m³<br>CEIL: 50 ppm |
| tert butanol | **OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 100 ppm 8 hours.<br>TWA: 300 mg/m³ 8 hours.<br>STEL: 150 ppm 15 minutes.<br>STEL: 450 mg/m³ 15 minutes.<br>**ACGIH TLV (United States, 3/2016).**<br>TWA: 100 ppm 8 hours.<br>TWA: 303 mg/m³ 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>TWA: 100 ppm 10 hours.<br>TWA: 300 mg/m³ 10 hours.<br>STEL: 150 ppm 15 minutes.<br>STEL: 450 mg/m³ 15 minutes.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 100 ppm 8 hours.<br>TWA: 300 mg/m³ 8 hours. |
| tert Amyl Methyl Ether | **ACGIH TLV (United States, 3/2016).**<br>TWA: 20 ppm 8 hours. |
| sec-butyl methyl ether | None. |
| propan-1-ol | **OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 200 ppm 8 hours.<br>TWA: 500 mg/m³ 8 hours. |

# Section 8. Exposure controls/personal protection

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|---|---|
| | STEL: 250 ppm 15 minutes.<br>STEL: 625 mg/m³ 15 minutes.<br>**NIOSH REL (United States, 10/2013).**<br>**Absorbed through skin.**<br>TWA: 200 ppm 10 hours.<br>TWA: 500 mg/m³ 10 hours.<br>STEL: 250 ppm 15 minutes.<br>STEL: 625 mg/m³ 15 minutes.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 200 ppm 8 hours.<br>TWA: 500 mg/m³ 8 hours.<br>**ACGIH TLV (United States, 3/2016).**<br>TWA: 100 ppm 8 hours. |
| tert-butyl methyl ether | **ACGIH TLV (United States, 3/2016).**<br>TWA: 50 ppm 8 hours. |
| Methyl Ethyl Ketone | **ACGIH TLV (United States, 3/2016).**<br>STEL: 885 mg/m³ 15 minutes.<br>STEL: 300 ppm 15 minutes.<br>TWA: 590 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>STEL: 885 mg/m³ 15 minutes.<br>STEL: 300 ppm 15 minutes.<br>TWA: 590 mg/m³ 10 hours.<br>TWA: 200 ppm 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 590 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>STEL: 885 mg/m³ 15 minutes.<br>STEL: 300 ppm 15 minutes.<br>TWA: 590 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours. |
| methanol | **ACGIH TLV (United States, 3/2016).**<br>**Absorbed through skin.**<br>STEL: 328 mg/m³ 15 minutes.<br>STEL: 250 ppm 15 minutes.<br>TWA: 262 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>**Absorbed through skin.**<br>STEL: 325 mg/m³ 15 minutes.<br>STEL: 250 ppm 15 minutes.<br>TWA: 260 mg/m³ 10 hours.<br>TWA: 200 ppm 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 260 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>**Absorbed through skin.**<br>STEL: 325 mg/m³ 15 minutes.<br>STEL: 250 ppm 15 minutes.<br>TWA: 260 mg/m³ 8 hours.<br>TWA: 200 ppm 8 hours. |
| propan-2-ol | **ACGIH TLV (United States, 3/2015).**<br>TWA: 200 ppm 8 hours.<br>STEL: 400 ppm 15 minutes.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 400 ppm 8 hours.<br>TWA: 980 mg/m³ 8 hours.<br>STEL: 500 ppm 15 minutes.<br>STEL: 1225 mg/m³ 15 minutes. |

# Section 8. Exposure controls/personal protection

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|---|---|
| | **NIOSH REL (United States, 10/2013).**<br>TWA: 400 ppm 10 hours.<br>TWA: 980 mg/m³ 10 hours.<br>STEL: 500 ppm 15 minutes.<br>STEL: 1225 mg/m³ 15 minutes.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 400 ppm 8 hours.<br>TWA: 980 mg/m³ 8 hours. |
| Isobutyl Alcohol | **ACGIH TLV (United States, 3/2016).**<br>TWA: 50 ppm 8 hours.<br>TWA: 152 mg/m³ 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 50 ppm 8 hours.<br>TWA: 150 mg/m³ 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>TWA: 50 ppm 10 hours.<br>TWA: 150 mg/m³ 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 100 ppm 8 hours.<br>TWA: 300 mg/m³ 8 hours. |
| 2-ethoxy-2-methylpropane | **ACGIH TLV (United States, 3/2016).**<br>TWA: 25 ppm 8 hours. |
| ethanol | **ACGIH TLV (United States, 3/2016).**<br>STEL: 1000 ppm 15 minutes.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 1000 ppm 8 hours.<br>TWA: 1900 mg/m³ 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>TWA: 1000 ppm 10 hours.<br>TWA: 1900 mg/m³ 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 1000 ppm 8 hours.<br>TWA: 1900 mg/m³ 8 hours. |
| dimethyl ether | **AIHA WEEL (United States, 10/2011).**<br>TWA: 1000 ppm 8 hours. |
| acetone | **ACGIH TLV (United States, 3/2016).**<br>STEL: 500 ppm 15 minutes.<br>TWA: 250 ppm 8 hours.<br>**NIOSH REL (United States, 10/2013).**<br>TWA: 590 mg/m³ 10 hours.<br>TWA: 250 ppm 10 hours.<br>**OSHA PEL (United States, 2/2013).**<br>TWA: 2400 mg/m³ 8 hours.<br>TWA: 1000 ppm 8 hours.<br>**OSHA PEL 1989 (United States, 3/1989).**<br>STEL: 2400 mg/m³ 15 minutes.<br>STEL: 1000 ppm 15 minutes.<br>TWA: 1800 mg/m³ 8 hours.<br>TWA: 750 ppm 8 hours. |

**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.

# Section 8. Exposure controls/personal protection

## 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. 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.

**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.

**Color** : Not available.

**Melting/freezing point** : -138°C (-216.4°F) This is based on data for the following ingredient: N-Butane.

**Critical temperature** : Lowest known value: 151.85°C (305.3°F) (N-Butane).

**Odor** : Not available.

**Odor threshold** : Not available.

**pH** : Not available.

**Flash point** : Not available.

**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** : Not available.

**Vapor density** : Highest known value: 2.1 (Air = 1) (N-Butane).

**Gas Density (lb/ft $^3$)** : Only known value: 0.1554 (N-Butane).

**Relative density** : Not applicable.

# Section 9. Physical and chemical properties

**Solubility** : Not available.

**Solubility in water** : Not available.

**Partition coefficient: n-octanol/water** : Not available.

**Auto-ignition temperature** : Not available.

**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.

**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

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| N-Butane | LC50 Inhalation Vapor | Rat | 658000 mg/m³ | 4 hours |
| butan-2-ol | LC50 Inhalation Gas. | Rat | 8000 ppm | 4 hours |
| | LC50 Inhalation Vapor | Rat | 48500 mg/m³ | 4 hours |
| | LD50 Oral | Rat | 2054 mg/kg | - |
| n-butyl alcohol | LC50 Inhalation Gas. | Rat | 16000 ppm | 1 hours |
| | LC50 Inhalation Vapor | Rat | 24000 mg/m³ | 4 hours |
| | LD50 Dermal | Rabbit | 3400 mg/kg | - |
| | LD50 Oral | Rat | 790 mg/kg | - |
| tert butanol | LC50 Inhalation Gas. | Rat | 20000 ppm | 1 hours |
| | LC50 Inhalation Gas. | Rat | 14100 ppm | 4 hours |
| | LD50 Oral | Rat | 2733 mg/kg | - |
| tert Amyl Methyl Ether | LD50 Oral | Rat | 1602 mg/kg | - |
| propan-1-ol | LC50 Inhalation Gas. | Rat | 8000 ppm | 1 hours |
| | LD50 Dermal | Rabbit | 5040 mg/kg | - |
| | LD50 Oral | Rat | 1870 mg/kg | - |
| tert-butyl methyl ether | LC50 Inhalation Gas. | Rat | 47152 ppm | 1 hours |
| | LC50 Inhalation Gas. | Rat | 23576 ppm | 4 hours |
| | LC50 Inhalation Vapor | Rat | 41000 mg/m³ | 4 hours |
| | LD50 Oral | Rat | 4 g/kg | - |
| Methyl Ethyl Ketone | LC50 Inhalation Gas. | Rat | 22527 ppm | 1 hours |
| | LD50 Dermal | Rabbit | 6480 mg/kg | - |
| | LD50 Oral | Rat | 2737 mg/kg | - |

# Section 11. Toxicological information

| | | | | |
|---|---|---|---|---|
| methanol | LC50 Inhalation Gas. | Rat | 145000 ppm | 1 hours |
| | LC50 Inhalation Gas. | Rat | 64000 ppm | 4 hours |
| propan-2-ol | LC50 Inhalation Gas. | Rat | 45248 ppm | 1 hours |
| | LD50 Dermal | Rabbit | 12800 mg/kg | - |
| | LD50 Oral | Rat | 5000 mg/kg | - |
| Isobutyl Alcohol | LC50 Inhalation Vapor | Rat | 19200 mg/m³ | 4 hours |
| | LD50 Dermal | Rabbit | 3400 mg/kg | - |
| | LD50 Oral | Rat | 2460 mg/kg | - |
| 2-ethoxy-2-methylpropane | LC50 Inhalation Vapor | Rat | 36200 mg/m³ | 4 hours |
| | LD50 Oral | Rat | 7150 mg/kg | - |
| dimethyl ether | LC50 Inhalation Gas. | Rat | 82000 ppm | 1 hours |
| | LC50 Inhalation Gas. | Rat | 164000 ppm | 4 hours |
| | LC50 Inhalation Vapor | Rat | 309 g/m³ | 4 hours |
| acetone | LC50 Inhalation Vapor | Rat | 59528 ppm | 1 hours |
| | LD50 Oral | Rat | 5800 mg/kg | - |

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| butan-2-ol | Eyes - Severe irritant | Rabbit | - | 0.1 Mililiters | - |
| n-butyl alcohol | Eyes - Severe irritant | Rabbit | - | 24 hours 2 milligrams | - |
| | Eyes - Severe irritant | Rabbit | - | 0.005 Mililiters | - |
| | Skin - Moderate irritant | Rabbit | - | 24 hours 20 milligrams | - |
| tert butanol | Eyes - Severe irritant | Rabbit | - | 24 hours 100 microliters | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 microliters | - |
| tert Amyl Methyl Ether | Eyes - Severe irritant | Rabbit | - | 24 hours 100 microliters | - |
| | Skin - Severe irritant | Rabbit | - | 4 hours 500 microliters | - |
| propan-1-ol | Eyes - Moderate irritant | Rabbit | - | 24 hours 20 milligrams | - |
| | Skin - Mild irritant | Human | - | 47 hours 100 Percent | - |
| | Skin - Mild irritant | Human | - | 24 hours 100 Percent | - |
| | Skin - Mild irritant | Rabbit | - | 500 milligrams | - |
| Methyl Ethyl Ketone | Skin - Mild irritant | Rabbit | - | 24 hours 14 milligrams | - |
| | Skin - Moderate irritant | Rabbit | - | 24 hours 500 milligrams | - |
| methanol | Eyes - Moderate irritant | Rabbit | - | 24 hours 100 milligrams | - |
| | Eyes - Moderate irritant | Rabbit | - | 40 milligrams | - |
| | Skin - Moderate irritant | Rabbit | - | 24 hours 20 milligrams | - |
| propan-2-ol | Eyes - Moderate irritant | Rabbit | - | 24 hours 100 milligrams | - |
| | Eyes - Moderate irritant | Rabbit | - | 10 milligrams | - |
| | Eyes - Severe irritant | Rabbit | - | 100 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 500 milligrams | - |
| 2-ethoxy-2-methylpropane | Eyes - Moderate irritant | Rabbit | - | 24 hours 100 microliters | - |
| | Skin - Moderate irritant | Rabbit | - | 4 hours 500 microliters | - |
| ethanol | Eyes - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |

# Section 11. Toxicological information

| | | | | | |
|---|---|---|---|---|---|
| | Eyes - Moderate irritant | Rabbit | - | 0.066666667 minutes 100 milligrams | - |
| | Eyes - Moderate irritant | Rabbit | - | 100 microliters | - |
| | Eyes - Severe irritant | Rabbit | - | 500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 400 milligrams | - |
| | Skin - Moderate irritant | Rabbit | - | 24 hours 20 milligrams | - |
| acetone | Eyes - Mild irritant | Human | - | 186300 parts per million | - |
| | Eyes - Mild irritant | Rabbit | - | 10 microliters | - |
| | Eyes - Moderate irritant | Rabbit | - | 24 hours 20 milligrams | - |
| | Eyes - Severe irritant | Rabbit | - | 20 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 395 milligrams | - |

## Sensitization

Not available.

## Mutagenicity

Not available.

## Carcinogenicity

Not available.

## Classification

| Product/ingredient name | OSHA | IARC | NTP |
|---|---|---|---|
| ethanol | - | 1 | - |
| propan-2-ol | - | 3 | - |
| tert-butyl methyl ether | - | 3 | - |

## Reproductive toxicity

Not available.

## Teratogenicity

Not available.

## Specific target organ toxicity (single exposure)

| Name | Category | Route of exposure | Target organs |
|---|---|---|---|
| butan-2-ol | Category 3 | Not applicable. | Respiratory tract irritation and Narcotic effects |
| n-butyl alcohol | Category 3 | Not applicable. | Respiratory tract irritation and Narcotic effects |
| tert butanol | Category 3 | Not applicable. | Respiratory tract irritation |
| tert Amyl Methyl Ether | Category 3 | Not applicable. | Narcotic effects |
| propan-1-ol | Category 3 | Not applicable. | Narcotic effects |
| Methyl Ethyl Ketone | Category 3 | Not applicable. | Narcotic effects |
| methanol | Category 1 | Not determined | respiratory tract |
| propan-2-ol | Category 3 | Not applicable. | Narcotic effects |
| Isobutyl Alcohol | Category 3 | Not applicable. | Respiratory tract irritation and |

# Section 11. Toxicological information

| | | | |
|---|---|---|---|
| acetone | Category 3 | Not applicable. | Narcotic effects<br>Narcotic effects |

### 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** : Liquid can cause burns similar to frostbite.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : 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:, frostbite

**Inhalation** : No specific data.

**Skin contact** : Adverse symptoms may include the following:, 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** : 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

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| butan-2-ol | Acute EC50 4227000 to 7143000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 3670000 to 3990000 µg/l Fresh water | Fish - Pimephales promelas | 96 hours |
| n-butyl alcohol | Acute EC50 1983000 to 2072000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 1910000 µg/l Fresh water | Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) | 96 hours |
| tert butanol | Acute EC50 5504000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 6410000 µg/l Fresh water | Fish - Pimephales promelas | 96 hours |
| tert Amyl Methyl Ether | Acute EC50 >100000 µg/l Fresh water | Algae - Pseudokirchneriella subcapitata | 72 hours |
| | Acute EC50 >100000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 >100000 µg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| | Chronic NOEC >100000 µg/l Fresh water | Algae - Pseudokirchneriella subcapitata | 72 hours |
| propan-1-ol | Acute EC50 4480000 µg/l Fresh water | Algae - Selenastrum sp. | 96 hours |
| | Acute LC50 1000000 µg/l Fresh water | Crustaceans - Gammarus pulex | 48 hours |
| | Acute LC50 2950000 µg/l Fresh water | Daphnia - Daphnia pulex | 48 hours |
| | Acute LC50 3800000 µg/l Marine water | Fish - Alburnus alburnus | 96 hours |
| tert-butyl methyl ether | Acute LC50 672000 µg/l Fresh water | Fish - Pimephales promelas | 96 hours |
| Methyl Ethyl Ketone | Acute EC50 >500000 µg/l Marine water | Algae - Skeletonema costatum | 96 hours |
| | Acute EC50 5091000 to 6440000 µg/l Fresh water | Daphnia - Daphnia magna - Larvae | 48 hours |
| | Acute LC50 5600 ppm Fresh water | Fish - Gambusia affinis - Adult | 96 hours |
| methanol | Acute EC50 16.912 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| | Acute LC50 2500000 µg/l Marine water | Crustaceans - Crangon crangon - Adult | 48 hours |
| | Acute LC50 3289 mg/l Fresh water | Daphnia - Daphnia magna - Neonate | 48 hours |
| | Acute LC50 290 mg/l Fresh water | Fish - Danio rerio - Egg | 96 hours |
| | Chronic NOEC 9.96 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| propan-2-ol | Acute LC50 1400000 to 1950000 µg/l Marine water | Crustaceans - Crangon crangon | 48 hours |
| | Acute LC50 4200 mg/l Fresh water | Fish - Rasbora heteromorpha | 96 hours |
| Isobutyl Alcohol | Acute LC50 600 mg/l Marine water | Crustaceans - Artemia salina | 48 hours |
| | Acute LC50 1030000 to 1200000 µg/l Fresh water | Daphnia - Daphnia magna - Neonate | 48 hours |
| | Acute LC50 1330000 to 1520000 µg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| | Chronic NOEC 4000 µg/l Fresh water | Daphnia - Daphnia magna | 21 days |
| ethanol | Acute EC50 17.921 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| | Acute EC50 2000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 25500 µg/l Marine water | Crustaceans - Artemia franciscana - Larvae | 48 hours |
| | Acute LC50 42000 µg/l Fresh water | Fish - Oncorhynchus mykiss | 4 days |
| | Chronic NOEC 4.995 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| | Chronic NOEC 100 ul/L Fresh water | Daphnia - Daphnia magna - Neonate | 21 days |
| | Chronic NOEC 0.375 ul/L Fresh water | Fish - Gambusia holbrooki - Larvae | 12 weeks |
| acetone | Acute EC50 20.565 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| | Acute LC50 6000000 µg/l Fresh water | Crustaceans - Gammarus pulex | 48 hours |
| | Acute LC50 10000 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 5600 ppm Fresh water | Fish - Poecilia reticulata | 96 hours |
| | Chronic NOEC 4.95 mg/l Marine water | Algae - Ulva pertusa | 96 hours |
| | Chronic NOEC 0.016 ml/L Fresh water | Crustaceans - Daphniidae | 21 days |
| | Chronic NOEC 0.1 ml/L Fresh water | Daphnia - Daphnia magna - | 21 days |

# Section 12. Ecological information

| | | | |
|---|---|---|---|
| | Chronic NOEC 5 µg/l Marine water | Neonate<br>Fish - Gasterosteus aculeatus - Larvae | 42 days |

## Persistence and degradability

Not available.

## Bioaccumulative potential

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| N-Butane | 2.89 | - | low |
| butan-2-ol | 0.61 | - | low |
| n-butyl alcohol | 1 | - | low |
| tert butanol | 0.4 | 5.01 | low |
| tert Amyl Methyl Ether | 1.55 | - | low |
| propan-1-ol | 0.2 | - | low |
| tert-butyl methyl ether | 1.04 | 1.5 | low |
| Methyl Ethyl Ketone | 0.3 | - | low |
| methanol | -0.77 | <10 | low |
| propan-2-ol | 0.05 | - | low |
| Isobutyl Alcohol | 1 | - | low |
| 2-ethoxy-2-methylpropane | 1.48 | - | low |
| ethanol | -0.35 | - | low |
| dimethyl ether | 0.07 | - | low |
| acetone | -0.23 | - | low |

## 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. 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.

# Section 14. Transport information

| | DOT | TDG | Mexico | IMDG | IATA |
|---|---|---|---|---|---|
| **UN number** | UN3161 | UN3161 | UN3161 | UN3161 | UN3161 |
| **UN proper shipping name** | Liquefied gas, flammable n.o.s. ( N-Butane, 1-Butanol) | Liquefied gas, flammable n.o.s. ( N-Butane, 1-Butanol) | Liquefied gas, flammable n.o.s. ( N-Butane, 1-Butanol) | Liquefied gas, flammable n.o.s. ( N-Butane, 1-Butanol) | Liquefied gas, flammable n.o.s. ( N-Butane, 1-Butanol) |
| **Transport hazard class(es)** | 2.1   | 2.1   | 2.1   | 2.1   | 2.1   |

# Section 14. Transport information

| | | | | | |
|---|---|---|---|---|---|
| **Packing group** | - | - | - | - | - |
| **Environment** | No. | No. | No. | No. | No. |
| **Additional information** | - | Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).<br><br>**Explosive Limit and Limited Quantity Index**<br>0.125<br><br>**ERAP Index**<br>3000<br><br>**Passenger Carrying Ship Index**<br>Forbidden<br><br>**Passenger Carrying Road or Rail Index**<br>Forbidden | - | - | - |

**"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** : **TSCA 8(a) PAIR**: 2-ethoxy-2-methylpropane; tert amyl methyl ether; Tert Butanol; butan-2-ol

**TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

**United States inventory (TSCA 8b)**: Not determined.

**Clean Air Act (CAA) 112 regulated flammable substances**: N-Butane

**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.

**SARA 304 RQ** : Not applicable.

**SARA 311/312**

# Section 15. Regulatory information

**Classification** : Fire hazard
Sudden release of pressure

## Composition/information on ingredients

| Name | % | Fire hazard | Sudden release of pressure | Reactive | Immediate (acute) health hazard | Delayed (chronic) health hazard |
|---|---|---|---|---|---|---|
| N-Butane | 98 - 99 | Yes. | Yes. | No. | No. | No. |
| butan-2-ol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| n-butyl alcohol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| tert butanol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| tert Amyl Methyl Ether | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| sec-butyl methyl ether | 0.0001 - 0.0999 | Yes. | No. | No. | No. | No. |
| propan-1-ol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| tert-butyl methyl ether | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| Methyl Ethyl Ketone | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| methanol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| propan-2-ol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| Isobutyl Alcohol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| 2-ethoxy-2-methylpropane | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| ethanol | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |
| dimethyl ether | 0.0001 - 0.0999 | Yes. | Yes. | No. | No. | No. |
| acetone | 0.0001 - 0.0999 | Yes. | No. | No. | Yes. | No. |

## State regulations

**Massachusetts** : The following components are listed: BUTANE

**New York** : None of the components are listed.

**New Jersey** : The following components are listed: BUTANE

**Pennsylvania** : The following components are listed: BUTANE

## California Prop. 65

**WARNING:** This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

| Ingredient name | Cancer | Reproductive | No significant risk level | Maximum acceptable dosage level |
|---|---|---|---|---|
| 2-ethoxy-2-methylpropane | No. | Yes. | No. | No. |
| methanol | No. | Yes. | No. | 23000 µg/day (ingestion)<br>47000 µg/day (inhalation) |
| tert amyl methyl ether | No. | Yes. | No. | No. |

## International regulations

### International lists

### National inventory

**Australia** : Not determined.

**Canada** : Not determined.

**China** : Not determined.

**Europe** : Not determined.

**Japan** : Not determined.

**Malaysia** : Not determined.

**New Zealand** : Not determined.

**Philippines** : Not determined.

**Republic of Korea** : Not determined.

**Taiwan** : All components are listed or exempted.

# Section 15. Regulatory information

## Canada

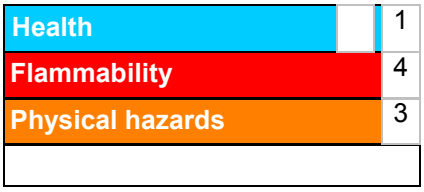
**WHMIS (Canada)** : Class A: Compressed gas.
Class B-1: Flammable gas.

**CEPA Toxic substances**: None of the components are listed.
**Canadian ARET**: None of the components are listed.
**Canadian NPRI**: The following components are listed: Butane (all isomers)
**Alberta Designated Substances**: None of the components are listed.
**Ontario Designated Substances**: None of the components are listed.
**Quebec Designated Substances**: None of the components are listed.

# Section 16. Other information

**Canada Label requirements** : Class A: Compressed gas.
Class B-1: Flammable gas.

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




**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. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.**

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

## National Fire Protection Association (U.S.A.)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## Procedure used to derive the classification

| Classification | Justification |
|---|---|
| Flam. Gas 1, H220<br>Press. Gas Liq. Gas, H280 | On basis of test data<br>On basis of test data |

## History

**Date of printing** : 9/12/2016

**Date of issue/Date of revision** : 9/12/2016

**Date of previous issue** : 6/2/2016

**Version** : 1

# Section 16. Other information

**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
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

**References** : Not available.

**Indicates information that has changed from previously issued version.**

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