SAFETY DATA SHEET

1. Identification

Product identifier: 2-PROPANOL

Other means of identification

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Number of Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>9088, 5892, 9095, 9084, 9083, 9082, 9079, 9078, 9059, 9055, 9045, 5986, 5978, 5977, 5967, 5873, 5863, 9827, 5373, 9334</td>
<td>19</td>
</tr>
</tbody>
</table>

Recommended use and restriction on use

**Recommended use:** Not available.

**Restrictions on use:** Not known.

Details of the supplier of the safety data sheet

**Manufacturer**

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax: 610-573-2610
Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

**Emergency telephone number:**

CHEMTREC: 1-800-424-9300 within US and Canada
CHEMTREC: 1-703-527-3887 outside US and Canada

2. Hazard(s) identification

**Hazard Classification**

- **Physical Hazards**
  - Flammable liquids
  - Category 2

- **Health Hazards**
  - Serious Eye Damage/Eye Irritation
  - Category 2A
  - Specific Target Organ Toxicity - Single Exposure
  - Category 3

**Label Elements**

- **Hazard Symbol:**

- **Signal Word:** Danger

- **Hazard Statement:**
  - Highly flammable liquid and vapor.
  - Causes serious eye irritation.
  - May cause drowsiness or dizziness.
Precautionary Statement

Prevention: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Avoid breathing dust/mist/vapors. Wash thoroughly after handling.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. 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 advice/attention.


Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td></td>
<td>67-63-0</td>
<td>98 - 100%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Wash skin thoroughly with soap and water. Get medical attention if symptoms occur.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention.

Most important symptoms/effects, acute and delayed

Symptoms: Harmful if swallowed. Narcotic effect. Irritating to eyes, respiratory system and skin.

SDS_US - SDS0000000696 2/10
Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: Flammable liquid and vapor.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. Vapor from the solvent may accumulate in container headspace resulting in flammability hazard.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Highly flammable liquid and vapour.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use only non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.
7. Handling and storage

Precautions for safe handling: DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Wear protective gloves/protective clothing/eye protection/face protection. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash hands thoroughly after handling.

Conditions for safe storage, including any incompatibilities: Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

8. Exposure controls/personal protection

Control Parameters

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>TWA</td>
<td>200 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>400 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td>REL</td>
<td>STEL</td>
<td>400 ppm/980 mg/m3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>400 ppm/980 mg/m3</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>400 ppm/980 mg/m3</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>500 ppm/1,225 mg/m3</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
</tr>
</tbody>
</table>

Biological Limit Values

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>40 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
</tbody>
</table>

Appropriate Engineering Controls

Individual protection measures, such as personal protective equipment

**General information:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

**Eye/face protection:** Wear safety glasses with side shields (or goggles).

**Skin Protection**

**Hand Protection:** Chemical resistant gloves

**Other:** Wear suitable protective clothing.
Respiratory Protection: In case of inadequate ventilation use suitable respirator.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

### 9. Physical and chemical properties

**Appearance**
- **Physical state:** liquid
- **Form:** liquid
- **Color:** Colorless
- **Odor:** Odor of rubbing alcohol
- **Odor threshold:** No data available.
- **pH:** No data available.
- **Melting point/freezing point:** -88.5 °C
- **Initial boiling point and boiling range:** 82 °C (101.3 kPa)
- **Flash Point:** 12 °C (Closed Cup)
- **Evaporation rate:** 2.8 n-butyl acetate=1
- **Flammability (solid, gas):** Class IB Flammable Liquid

#### Upper/lower limit on flammability or explosive limits
- **Flammability limit - upper (%):** 12 % (V)
- **Flammability limit - lower (%):** 2.5 % (V)
- **Explosive limit - upper (%):** No data available.
- **Explosive limit - lower (%):** No data available.

**Vapor pressure:** 6.0 kPa (25 °C)

**Vapor density:** 2.1 AIR=1

**Relative density:** 0.7850 (4 °C)

**Solubility(ies)**
- **Solubility in water:** Miscible with water.
- **Solubility (other):** No data available.

**Partition coefficient (n-octanol/water):** 0.05

**Auto-ignition temperature:** 399 °C

**Decomposition temperature:** No data available.

**Viscosity:** No data available.

**Other information**
- **Molecular weight:** 60.1 g/mol (C3H8O)

### 10. Stability and reactivity

**Reactivity:** No dangerous reaction known under conditions of normal use.

**Chemical Stability:** Material is stable under normal conditions.

**Possibility of hazardous reactions:** Hazardous polymerization does not occur.

**Conditions to avoid:** Heat, sparks, flames. Sunlight.

<table>
<thead>
<tr>
<th>Hazardous Decomposition Products:</th>
<th>Thermal decomposition may release oxides of carbon.</th>
</tr>
</thead>
</table>

## 11. Toxicological information

### Information on likely routes of exposure

- **Ingestion:** Irritating. May cause nausea, stomach pain and vomiting.
- **Inhalation:** May cause irritation to the mucous membranes and upper respiratory tract.
- **Skin Contact:** Prolonged or repeated skin contact may cause drying, cracking, or irritation.
- **Eye contact:** Causes serious eye irritation.

### Information on toxicological effects

#### Acute toxicity (list all possible routes of exposure)

- **Oral**
  - **Product:** LD 50 (Rat): 5,045 mg/kg

- **Dermal**
  - **Product:** LD 50 (Rabbit): 12,800 mg/kg

- **Inhalation**
  - **Product:** No data available.

- **Repeated dose toxicity**
  - **Product:** No data available.

#### Skin Corrosion/Irritation

- **Product:** Prolonged or repeated skin contact may cause drying, cracking, or irritation.

#### Serious Eye Damage/Eye Irritation

- **Product:** Causes serious eye irritation.

#### Respiratory or Skin Sensitization

- **Product:** Not a skin sensitizer.

#### Carcinogenicity

- **Product:** This substance has no evidence of carcinogenic properties.

- **IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**
  - No carcinogenic components identified

- **US. National Toxicology Program (NTP) Report on Carcinogens:**
  - No carcinogenic components identified

- **US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**
  - No carcinogenic components identified

#### Germ Cell Mutagenicity

- **In vitro**
  - **Product:** No data available.

- **In vivo**
  - **Product:** No data available.

#### Reproductive toxicity

- **Product:** No components toxic to reproduction

#### Specific Target Organ Toxicity - Single Exposure
Product: Narcotic effect.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: May be harmful if swallowed and enters airways.

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Western mosquitofish (Gambusia affinis), 96 h): > 1,400 mg/l

Aquatic Invertebrates
Product: LC 50 (Water flea (Daphnia magna), 24 h): 10,000 mg/l

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: 0.05

Mobility in Soil: The product is partly soluble in water. May spread in the aquatic environment.

Other Adverse Effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.
Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT
UN Number: UN 1219
UN Proper Shipping Name: Isopropanol
Transport Hazard Class(es):
Class(es): 3
Label(s): 3
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –

IMDG
UN Number: UN 1219
UN Proper Shipping Name: ISOPROPANOL
Transport Hazard Class(es):
Class(es): 3
Label(s): 3
EmS No.: F-E, S-D
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –

IATA
UN Number: UN 1219
Proper Shipping Name: Isopropanol
Transport Hazard Class(es):
Class(es): 3
Label(s): 3
Marine Pollutant: Not a Marine Pollutant
Packing Group: II
Special precautions for user: –

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>100 lbs.</td>
</tr>
</tbody>
</table>

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute (Immediate)
Fire

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>100 lbs.</td>
</tr>
</tbody>
</table>
SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>10000 lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for</th>
<th>Reporting threshold for</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISOPROPYL ALCOHOL</td>
<td>other users</td>
<td>processing</td>
</tr>
<tr>
<td></td>
<td>10000 lbs</td>
<td>25000 lbs.</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity ISOPROPYL ALCOHOL

US. Massachusetts RTK - Substance List

Chemical Identity ISOPROPYL ALCOHOL

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity ISOPROPYL ALCOHOL

US. Rhode Island RTK

Chemical Identity ISOPROPYL ALCOHOL

Inventory Status:

Australia AICS: On or in compliance with the inventory
Canada DSL Inventory List: On or in compliance with the inventory
EU EINECS List: On or in compliance with the inventory
EU ELINCS List: Not in compliance with the inventory
Japan (ENCS) List: On or in compliance with the inventory
EU No Longer Polymers List: Not in compliance with the inventory
China Inv. Existing Chemical Substances: On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
Canada NDSL Inventory: Not in compliance with the inventory
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Switzerland Consolidated Inventory: Not in compliance with the inventory
Japan ISHL Listing: On or in compliance with the inventory
Japan Pharmacopoeia Listing: Not in compliance with the inventory
NFPA Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 10-27-2015
Revision Date: No data available.
Version #: 1.2
Further Information: No data available.

Disclaimer:

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1 Identification of the substance/mixture and of the company

· Product identifier
  · Trade name: 495 PMMA Series Resists in Anisole

· Product number:
  M130001, M130002, M130003, M130004, M130504, M130005, M130505, M130006, M130007, M130507,
  M130008, M130508, M130009, M130010, M130011, M130015, M130515

· Application of the substance / the mixture
  Photoresist

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA

· Information department:
  · Product Safety
  · Email: productsafety@microchem.com

· Emergency telephone number:
  · MicroChem Corp : 617-965-5511
  · Chemtrec USA Emergency : 800-424-9300
  · Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

· Classification of the substance or mixture
  · GHS02 Flame
    Flam. Liq. 3 H226 Flammable liquid and vapor.

  · GHS07
    Acute Tox. 4 H332 Harmful if inhaled.
    Skin Irrit. 2 H315 Causes skin irritation.
    Eye Irrit. 2A H319 Causes serious eye irritation.
    STOT SE 3 H335 May cause respiratory irritation.

· Label elements
  · GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms
  · GHS02
  · GHS07

· Signal word Warning

· Hazard-determining components of labeling:
  · Anisole

· Hazard statements
  · H226 Flammable liquid and vapor.
  · H332 Harmful if inhaled.
  · H315 Causes skin irritation.

Contd. on page 2
Trade name: 495 PMMA Series Resists in Anisole

H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

HMIS-ratings (scale 0 - 4)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures
Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Substance</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>106-66-3</td>
<td>Anisole</td>
<td>80-100%</td>
</tr>
<tr>
<td>9011-14-7</td>
<td>Poly(methyl methacrylate)</td>
<td>1-20%</td>
</tr>
</tbody>
</table>
4 First-aid measures

· Description of first aid measures
· After inhalation:
  Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues.
· After skin contact:
  Immediately wash with water and soap and rinse thoroughly.
· After eye contact:
  Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· After swallowing:
  Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
· Information for doctor:
  · Most important symptoms and effects, both acute and delayed
    No further relevant information available.
  · Indication of any immediate medical attention and special treatment needed
    No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents:
  Alcohol resistant foam
  Fire-extinguishing powder
  Carbon dioxide
· For safety reasons unsuitable extinguishing agents:
  Water with full jet
  Water
· Special hazards arising from the substance or mixture
  Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.
· Advice for firefighters
· Protective equipment: Wear SCBA.

6 Accidental release measures

· Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation
  Keep away from ignition sources
· Environmental precautions: Do not allow to enter sewers/surface or ground water.
· Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents
· Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
7 Handling and storage

· Handling:
· Precautions for safe handling
  Use only under yellow light
  Keep receptacles tightly sealed.
  Use only in well ventilated areas.
  Ensure good ventilation/exhaust at the workplace.
  Prevent formation of aerosols.
· Information about protection against explosions and fires:
  Keep ignition sources away - Do not smoke.
  Use explosion-proof apparatus / fittings and spark-proof tools.
  Protect against electrostatic charges.
· Conditions for safe storage, including any incompatibilities
· Storage:
  · Requirements to be met by storerooms and containers:
    Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.
  · Information about storage in one common storage facility: Not required.
· Further information about storage conditions:
  Keep container tightly sealed.
  Protect from exposure to the light.
  Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.
· Specific end use(s) Preparation of radiation sensitive layers in fabrication of microelectronic devices

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.
· Control parameters
· Components with limit values that require monitoring at the workplace:
  The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· Additional information: The lists that were valid during the creation were used as basis.
· Exposure controls
· Personal protective equipment:
· General protective and hygienic measures:
  Wash hands before breaks and at the end of work.
  Keep away from food and beverages.
  Immediately remove all soiled and contaminated clothing.
  Avoid contact with the eyes and skin.
· Respiratory equipment: Use suitable respiratory protective device in case of insufficient ventilation.
· Protection of hands:

Protective gloves

Contact glove manufacturer for break-through time.

· Material of gloves
  VITON®
  Nitrile rubber, NBR
· Penetration time of glove material Contact glove manufacturer for break-through time.
### 9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
  - **Appearance:**
    - Form: Liquid
    - Color: Clear to light yellow
  - Odor: Strong
  - Odour threshold: Not determined.
- **pH-value:** Not determined.
- **Change in condition**
  - Melting point/Melting range: Undetermined.
  - Boiling point/Boiling range: 184 °C (363 °F)
- **Flash point:** 43 °C (109 °F)
- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:** 475 °C (887 °F)
- **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not selfigniting.
- **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
- **Explosion limits:**
  - Lower: Not determined.
  - Upper: Not determined.
- **Vapor pressure at 20 °C (68 °F):** 0.4 hPa
- **Density:** Not determined.
- **Relative density**
  - See Table 1 Other Information
- **Vapour density**
  - Not determined.
- **Evaporation rate**
  - Not determined.
- **Solubility in / Miscibility with**
  - Water: Water miscible No
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - Dynamic: Not determined.
  - Kinematic: Not determined.
Trade name: 495 PMMA Series Resists in Anisole

Solvent content: See Table 1 below
VOC content: See Table 1 below
Other information: See Table 1 below

Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Sp.Grav.</th>
<th>Vol.(%by wt.)</th>
<th>VOC (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>495A1</td>
<td>M130001</td>
<td>0.995</td>
<td>99</td>
<td>985</td>
</tr>
<tr>
<td>495A2</td>
<td>M130002</td>
<td>0.997</td>
<td>98</td>
<td>975</td>
</tr>
<tr>
<td>495A3</td>
<td>M130003</td>
<td>0.999</td>
<td>97</td>
<td>970</td>
</tr>
<tr>
<td>495A4</td>
<td>M130004</td>
<td>1.001</td>
<td>96</td>
<td>960</td>
</tr>
<tr>
<td>495A4.5</td>
<td>M130504</td>
<td>1.002</td>
<td>95.5</td>
<td>957</td>
</tr>
<tr>
<td>495A5</td>
<td>M130005</td>
<td>1.003</td>
<td>95</td>
<td>955</td>
</tr>
<tr>
<td>495A5.5</td>
<td>M130505</td>
<td>1.004</td>
<td>94.5</td>
<td>950</td>
</tr>
<tr>
<td>495A6</td>
<td>M130006</td>
<td>1.005</td>
<td>94</td>
<td>945</td>
</tr>
<tr>
<td>495A7</td>
<td>M130007</td>
<td>1.007</td>
<td>93</td>
<td>935</td>
</tr>
<tr>
<td>495A7.5</td>
<td>M130507</td>
<td>1.008</td>
<td>92.5</td>
<td>930</td>
</tr>
<tr>
<td>495A8</td>
<td>M130008</td>
<td>1.009</td>
<td>92</td>
<td>930</td>
</tr>
<tr>
<td>495A8.5</td>
<td>M130508</td>
<td>1.010</td>
<td>91.5</td>
<td>925</td>
</tr>
<tr>
<td>495A9</td>
<td>M130009</td>
<td>1.011</td>
<td>91</td>
<td>920</td>
</tr>
<tr>
<td>495A10</td>
<td>M130010</td>
<td>1.013</td>
<td>90</td>
<td>910</td>
</tr>
<tr>
<td>495A11</td>
<td>M130011</td>
<td>1.014</td>
<td>89</td>
<td>900</td>
</tr>
<tr>
<td>495A15</td>
<td>M130015</td>
<td>1.018</td>
<td>85</td>
<td>865</td>
</tr>
<tr>
<td>495A15.5</td>
<td>M130515</td>
<td>1.019</td>
<td>84.5</td>
<td>860</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

Reactivity
Chemical stability Stable under normal use conditions
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
Possibility of hazardous reactions No dangerous reactions known.
Conditions to avoid No further relevant information available.
Incompatible materials: Strong Oxidizing Agents, Strong Acids, Strong Bases
Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Phenol
methyl methacrylate

11 Toxicological information

Information on toxicological effects
Acute toxicity:
LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>100-66-3 Anisole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
</tr>
<tr>
<td>Dermal</td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.
Sensitization: No sensitizing effects known.
Experience with humans: No further relevant information available.
Trade name: 495 PMMA Series Resists in Anisole

- Additional toxicological information:
  The product shows the following dangers according to internally approved calculation methods for preparations:
  Irritant

- Carcinogenic categories
  
<table>
<thead>
<tr>
<th>IARC (International Agency for Research on Cancer)</th>
<th>NTP (National Toxicology Program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9011-14-7 Poly(methyl methacrylate)</td>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

12 Ecological information

- Toxicity
  - Aquatic toxicity:
    
    | 100-66-3 Anisole |
    |-----------------|
    | EC50/24 h 40 mg/l (daphnia magna) |
    | EC50/96 hr 162 mg/l (green algae) |
    | LC50/48 hr 120 mg/L (Cyprinus carpio (common carp)) |

- Persistence and degradability
  No further relevant information available.

- Behavior in environmental systems:
  - Bioaccumulative potential
    No further relevant information available.
  - Mobility in soil
    No further relevant information available.

- Additional ecological information:
  - General notes:
    Water hazard class 2 (Self-assessment): hazardous for water
    Do not allow product to reach ground water, water course or sewage system.
    Danger to drinking water if even small quantities leak into the ground.
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - Other adverse effects
    No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation:
    Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
    Disposal must be made in accordance with Federal, State, and Local regulations.

- Uncleaned packagings:
  - Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA: UN1866

- UN proper shipping name
  - DOT, ADR: Resin solution
### 15 Regulatory information

<table>
<thead>
<tr>
<th>Section 355 (extremely hazardous substances):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 313 (Specific toxic chemical listings):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients is listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TSCA (Toxic Substances Control Act):</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ingredients are listed or comply with TSCA regulations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals known to cause cancer:</td>
</tr>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemicals known to cause reproductive toxicity for females:</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
<tr>
<td><strong>Chemicals known to cause reproductive toxicity for males:</strong></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Chemicals known to cause developmental toxicity:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Carcinogenic categories</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EPA (Environmental Protection Agency)</strong></td>
</tr>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>TLV (Threshold Limit Value established by ACGIH)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>NIOSH-Ca (National Institute for Occupational Safety and Health)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>OSHA-Ca (Occupational Safety &amp; Health Administration)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>New Jersey State Right To Know List</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>100-66-3 Anisole</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>California SCAQMD Rule 443.1 VOC's:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>See Table 1 - Section 9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GHS label elements</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The product is classified and labeled according to the Globally Harmonized System (GHS).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Signal word</strong> Warning</th>
</tr>
</thead>
</table>

| **Hazard-determining components of labeling:**                 |
| Anisole                                                        |

<table>
<thead>
<tr>
<th><strong>Hazard statements</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>H226 Flammable liquid and vapor.</td>
</tr>
<tr>
<td>H332 Harmful if inhaled.</td>
</tr>
<tr>
<td>H315 Causes skin irritation.</td>
</tr>
<tr>
<td>H319 Causes serious eye irritation.</td>
</tr>
<tr>
<td>H335 May cause respiratory irritation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Precautionary statements</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.</td>
</tr>
<tr>
<td>P261 Avoid breathing dust/fume/gas/mist/vapours/spray.</td>
</tr>
<tr>
<td>P280 Wear protective gloves/protective clothing/eye protection/face protection.</td>
</tr>
<tr>
<td>P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.</td>
</tr>
<tr>
<td>P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</td>
</tr>
<tr>
<td>P332+P313 If skin irritation occurs: Get medical advice/attention.</td>
</tr>
<tr>
<td>P337+P313 If eye irritation persists: Get medical advice/attention.</td>
</tr>
<tr>
<td>P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.</td>
</tr>
<tr>
<td>P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.</td>
</tr>
<tr>
<td>P370+P378 In case of fire: Use for extinction: Carbon dioxide.</td>
</tr>
<tr>
<td>P302+P352 IF ON SKIN: Wash with plenty of soap and water.</td>
</tr>
<tr>
<td>P403+P233 Store in a well-ventilated place. Keep container tightly closed.</td>
</tr>
<tr>
<td>P501 Dispose of contents/container in accordance with local/regional/national/international regulations.</td>
</tr>
</tbody>
</table>
Trade name: 495 PMMA Series Resists in Anisole

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Department issuing MSDS: Product safety department
· Contact: Mr. Cole

· Revision History:
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.
· Date of preparation / last revision 12/23/2015 / 1
· Abbreviations and acronyms:
  RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  ICAO: International Civil Aviation Organization
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  ELINCS: European List of Notified Chemical Substances
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  VOC: Volatile Organic Compounds (USA, EU)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
1 Identification of the substance/mixture and of the company

· Product identifier
  · Trade name: 950 PMMA Series Resists in Anisole

· Product number:
  M230001, M230002, M230003, M230004, M230504, M230005, M230505, M230006, M230007, M230008,
  M230009, M230010, M230011, M230012, M230013, M230015

· Application of the substance / the mixture Photoresist

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA

  · Information department:
    Product Safety
    Email: productsafety@microchem.com

  · Emergency telephone number:
    MicroChem Corp : 617-965-5511
    Chemtrec USA Emergency : 800-424-9300
    Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

· Classification of the substance or mixture
  
  GHS02 Flame

  Flam. Liq. 3 H226 Flammable liquid and vapor.

  GHS07

  Acute Tox. 4 H332 Harmful if inhaled.
  Skin Irrit. 2 H315 Causes skin irritation.
  Eye Irrit. 2A H319 Causes serious eye irritation.
  STOT SE 3 H335 May cause respiratory irritation.

· Label elements
  · GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
  · Hazard pictograms

    GHS02 GHS07

· Signal word Warning

· Hazard-determining components of labeling:
  Anisole

· Hazard statements
  H226 Flammable liquid and vapor.
  H332 Harmful if inhaled.
  H315 Causes skin irritation.
Trade name: 950 PMMA Series Resists in Anisole

H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

• Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

• Classification system:
• NFPA ratings (scale 0 - 4)

Health = 1
Fire = 2
Reactivity = 0

• HMIS-ratings (scale 0 - 4)

Health = 1
Fire = 2
Reactivity = 0

• Other hazards
• Results of PBT and vPvB assessment
• PBT: Not applicable.
• vPvB: Not applicable.

3 Composition/information on ingredients

• Chemical characterization: Mixtures
• Description: Mixture of the substances listed below with nonhazardous additions.

> Dangerous components:

<table>
<thead>
<tr>
<th>100-66-3 Anisole</th>
<th>80-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flamm. Liq. 3, H226; Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335</td>
<td></td>
</tr>
</tbody>
</table>

> Additional Components:

| 9011-14-7 Poly(methyl methacrylate) | 1-20% |

(Contd. on page 3)
4 First-aid measures

- **Description of first aid measures**
- **After inhalation:** Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
- **Information for doctor:**
  - Most important symptoms and effects, both acute and delayed: No further relevant information available.
  - Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
  - Alcohol resistant foam
  - Fire-extinguishing powder
  - Carbon dioxide
- **For safety reasons unsuitable extinguishing agents:**
  - Water with full jet
  - Water
- **Special hazards arising from the substance or mixture**
  - Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.
- **Advice for firefighters**
  - Protective equipment: Wear SCBA.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Keep away from ignition sources
  - Ensure adequate ventilation
  - Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Do not allow to enter sewers/surface or ground water.
- **Methods and material for containment and cleaning up:**
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Ensure adequate ventilation.
  - Do not flush with water or aqueous cleansing agents
- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.

(Contd. on page 4)
7 Handling and storage

· Handling:
· Precautions for safe handling
  Use only under yellow light
  Keep receptacles tightly sealed.
  Use only in well ventilated areas.
  Ensure good ventilation/exhaust at the workplace.
  Prevent formation of aerosols.
· Information about protection against explosions and fires:
  Use explosion-proof apparatus / fittings and spark-proof tools.
  Keep ignition sources away - Do not smoke.
  Protect against electrostatic charges.
· Conditions for safe storage, including any incompatibilities
· Storage:
· Requirements to be met by storerooms and containers:
  Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.
· Information about storage in one common storage facility: Not required.
· Further information about storage conditions:
  Protect from exposure to the light.
  Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.
  Keep container tightly sealed.
· Specific end use(s) Preparation of radiation sensitive layers in fabrication of microelectronic devices

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.
· Control parameters
· Components with limit values that require monitoring at the workplace:
  The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· Additional information: The lists that were valid during the creation were used as basis.
· Exposure controls
· Personal protective equipment:
· General protective and hygienic measures:
  Keep away from food and beverages.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Avoid contact with the eyes and skin.
· Respiratory equipment:
  In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
· Protection of hands:

  Protective gloves

  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
  Contact glove manufacturer for break-through time.
Trade name: 950 PMMA Series Resists in Anisole

- **Material of gloves**
  - Fluorocarbon rubber (Viton)
  - Nitrile rubber, NBR
- **Penetration time of glove material** Contact glove manufacture for break-through time.
- **For the permanent contact gloves made of the following materials are suitable:** Fluorocarbon rubber (Viton)
- **As protection from splashes gloves made of the following materials are suitable:** Nitrile rubber, NBR
- **Eye protection:** Tightly sealed goggles
- **Body protection:** Impervious protective clothing

### 9 Physical and chemical properties

| Information on basic physical and chemical properties
| General Information
| Appearance:
| Form: Liquid
| Color: Clear to light yellow
| Odor: Strong
| Odour threshold: Not determined.
| pH-value: Not determined.
| Change in condition
| Melting point/Melting range: Undetermined.
| Boiling point/Boiling range: 184 °C (363 °F)
| Flash point: 43 °C (109 °F)
| Flammability (solid, gaseous): Not applicable.
| Ignition temperature: 475 °C (887 °F)
| Decomposition temperature: Not determined.
| Auto igniting: Product is not selfigniting.
| Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
| Explosion limits:
| Lower: Not determined.
| Upper: Not determined.
| Vapor pressure at 20 °C (68 °F): 0.4 hPa
| Density: See Table 1 Other Information below
| Relative density: Not determined.
| Vapour density: Not determined.
| Evaporation rate: Not determined.
| Solubility in / Miscibility with Water: Water miscible No
| Partition coefficient (n-octanol/water): Not determined.

(Contd. on page 6)
Trade name: 950 PMMA Series Resists in Anisole

· **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.

· **Solvent content:** See Table 1 below
  
· **VOC content:** Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Sp.Grav.</th>
<th>Vol. (% by wt.)</th>
<th>VOC (g/L)</th>
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<td>M230002</td>
<td>0.996</td>
<td>98</td>
<td>975</td>
</tr>
<tr>
<td>950A3</td>
<td>M230003</td>
<td>0.998</td>
<td>97</td>
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<tr>
<td>950A4</td>
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<td>96</td>
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<tr>
<td>950A4.5</td>
<td>M230504</td>
<td>1.001</td>
<td>95.5</td>
<td>958</td>
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<tr>
<td>950A5</td>
<td>M230005</td>
<td>1.004</td>
<td>95</td>
<td>955</td>
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<tr>
<td>950A5.5</td>
<td>M230505</td>
<td>1.004</td>
<td>94.5</td>
<td>950</td>
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<tr>
<td>950A6</td>
<td>M230006</td>
<td>1.005</td>
<td>94</td>
<td>945</td>
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<td>950A7</td>
<td>M230007</td>
<td>1.007</td>
<td>93</td>
<td>935</td>
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<td>950A8</td>
<td>M230008</td>
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<td>92</td>
<td>930</td>
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<td>950A12</td>
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<td>950A13</td>
<td>M230013</td>
<td>1.018</td>
<td>87</td>
<td>885</td>
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<tr>
<td>950A15</td>
<td>M230015</td>
<td>1.022</td>
<td>85</td>
<td>870</td>
</tr>
</tbody>
</table>

**10 Stability and reactivity**

· **Reactivity**
· **Chemical stability:** Stable under normal use conditions
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions:** No dangerous reactions known.
· **Conditions to avoid:** No further relevant information available.
· **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
· **Hazardous decomposition products:**
  - Carbon monoxide and carbon dioxide
  - Phenol
  - Methyl methacrylate

**11 Toxicological information**

· **Information on toxicological effects**
· **Acute toxicity:**
  
· **LD/LC50 values that are relevant for classification:**

<table>
<thead>
<tr>
<th>100-66-3 Anisole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
</tr>
<tr>
<td>Dermal LD50</td>
</tr>
</tbody>
</table>

· **Primary irritant effect:**
  - **on the skin:** Irritant to skin and mucous membranes.
  - **on the eye:** Irritating effect.
Trade name: 950 PMMA Series Resists in Anisole

- **Sensitization:** No sensitizing effects known.
- **Experience with humans:** No further relevant information available.
- **Additional toxicological information:**
  The product shows the following dangers according to internally approved calculation methods for preparations:
  - Irritant

**Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**
  - 9011-14-7 Poly(methyl methacrylate)
  - 3

- **NTP (National Toxicology Program)**
  - None of the ingredients are listed.

### 12 Ecological information

- **Toxicity**

  - **Aquatic toxicity:**
    - **100-66-3 Anisole**
      - EC50/24 h: 40 mg/l (Daphnia magna)
      - EC50/96 hr: 162 mg/l (green algae)
      - LC50/48 hr: 120 mg/L (Cyprinus carpio (common carp))

- **Persistence and degradability** Moderately /partly biodegradable
- **Behavior in environmental systems:**
  - Bioaccumulative potential: No further relevant information available.
  - Mobility in soil: No further relevant information available.
- **Additional ecological information:**
  - **General notes:**
    - Water hazard class 2 (Self-assessment): hazardous for water
    - Do not allow product to reach ground water, water course or sewage system.
    - Danger to drinking water if even small quantities leak into the ground.
  - **Results of PBT and vPvB assessment**
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - **Other adverse effects** No further relevant information available.

### 13 Disposal considerations

- **Waste treatment methods**
  - Recommendation:
    - Disposal must be made in accordance with Federal, State, and Local regulations.
    - Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
  - Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

### 14 Transport information

- **UN-Number**
  - DOT, ADR, IMDG, IATA: UN1866

(Contd. on page 8)
### Trade name: 950 PMMA Series Resists in Anisole

<table>
<thead>
<tr>
<th>· UN proper shipping name</th>
<th>· DOT, ADR</th>
<th>· IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>· DOT, ADR</td>
<td>Resin solution</td>
<td>RESIN SOLUTION</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>· Transport hazard class(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>· DOT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Class</th>
<th>· Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Flammable liquids.</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· ADR, IMDG, IATA</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>· Class</th>
<th>· Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Flammable liquids</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Packing group</th>
</tr>
</thead>
<tbody>
<tr>
<td>· DOT, ADR, IMDG, IATA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Environmental hazards:</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Marine pollutant:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Special precautions for user</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Danger code (Kemler):</td>
</tr>
<tr>
<td>· EMS Number:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>· UN &quot;Model Regulation&quot;:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 15 Regulatory information

<table>
<thead>
<tr>
<th>· Safety, health and environmental regulations/legislation specific for the substance or mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Sara</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Section 355 (extremely hazardous substances):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Section 313 (Specific toxic chemical listings):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients is listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· TSCA (Toxic Substances Control Act):</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ingredients are listed or comply with TSCA regulations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Chemicals known to cause cancer:</td>
</tr>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>
Trade name: 950 PMMA Series Resists in Anisole

- **Chemicals known to cause reproductive toxicity for females:**
  None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**
  None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**
  None of the ingredients are listed.

- **Carcinogenic categories**
  - EPA (Environmental Protection Agency)
    None of the ingredients are listed.
  - TLV (Threshold Limit Value established by ACGIH)
    None of the ingredients are listed.
  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    None of the ingredients are listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    None of the ingredients are listed.

- **New Jersey State Right To Know List**
  100-66-3 Anisole

- **California SCAQMD Rule 443.1 VOC's:** See Table 1 - Section 9

- **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**

  - GHS02
  - GHS07

- **Signal word** Warning

- **Hazard-determining components of labeling:**
  Anisole

- **Hazard statements**
  H226 Flammable liquid and vapor.
  H332 Harmful if inhaled.
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.
  H335 May cause respiratory irritation.

- **Precautionary statements**
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P260 Do not breathe dust/fume/gas/mist/vapours/spray.
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P273 Avoid release to the environment.
  P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
  P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
  P332+P313 If skin irritation occurs: Get medical advice/attention.
  P337+P313 If eye irritation persists: Get medical advice/attention.
  P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
**Trade name:** 950 PMMA Series Resists in Anisole

- **P370+P378** In case of fire: Use for extinction: Fire-extinguishing powder.
- **P370+P378** In case of fire: Use for extinction: Carbon dioxide.
- **P302+P352** IF ON SKIN: Wash with plenty of soap and water.
- **P403+P233** Store in a well-ventilated place. Keep container tightly closed.
- **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

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**16 Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing MSDS:** Product safety department
- **Contact:** Mr. Cole

**Revision History:**
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.

**Date of preparation / last revision** 12/23/2015 / 1

**Abbreviations and acronyms:**
- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- ICAO: International Civil Aviation Organization
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- ACGIH: American Conference of Governmental Industrial Hygienists
- EINECS: European Inventory of Existing Commercial Chemical Substances
- ELINCS: European List of Notified Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- NFPA: National Fire Protection Association (USA)
- HMIS: Hazardous Materials Identification System (USA)
- VOC: Volatile Organic Compounds (USA, EU)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
## SAFETY DATA SHEET

### 1. Identification

**Product identifier:** ACETONE

**Other means of identification**

**Synonyms:** 2-Propanone, Dimethyl ketone

**Product No.:** 2462, 2572, 2570, 9422, 9036, 9015, 9010, 9009, 9008, 9006, 9005, 9003, 9002, 2443, 2437, 2435, 2432, H580, 5975, 5965, H451, 2440, A134, 5580, 5356, 5018, 5008, 9271, 9254, 70444, 10654

**Recommended use and restriction on use**

**Recommended use:** Not available.

**Restrictions on use:** Not known.

**Details of the supplier of the safety data sheet**

**Manufacturer**

- **Company Name:** Avantor Performance Materials, Inc.
- **Address:** 3477 Corporate Parkway, Suite 200
  Center Valley, PA 18034
- **Telephone:** Customer Service: 855-282-6867
- **Fax:** 610-573-2610
- **Contact Person:** Environmental Health & Safety
- **E-mail:** info@avantormaterials.com

**Emergency telephone number:**

- CHEMTREC: 1-800-424-9300 within US and Canada
- CHEMTREC: 1-703-527-3887 outside US and Canada

### 2. Hazard(s) identification

**Hazard Classification**

**Physical Hazards**

- Flammable liquids Category 2

**Health Hazards**

- Serious Eye Damage/Eye Irritation Category 2A
- Specific Target Organ Toxicity - Single Exposure Category 3
- Aspiration Hazard Category 2

**Label Elements**

**Hazard Symbol:**

![Hazard Symbols]

---

SDS.US - SDS0000001650  
1/11
Signal Word: Danger

Hazard Statement: Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness or dizziness. May be harmful if swallowed and enters airways.

Precautionary Statement

Prevention: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting/equipment. Ground and bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash thoroughly after handling. Avoid breathing dust/mist/vapors/spray. Use only outdoors or in a well-ventilated area.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. 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 advice/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

Storage: Store in a well-ventilated place. Keep cool. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Substances

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
<td></td>
<td>67-64-1</td>
<td>99 - 100%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation persists after washing.

Most important symptoms/effects, acute and delayed

Symptoms: Narcotic effect.

Indication of immediate medical attention and special treatment needed

Treatment: Symptoms may be delayed. Treat symptomatically.

5. Fire-fighting measures

General Fire Hazards: Flammable liquid and vapor.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. Heat may cause the containers to explode.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: See Section 8 of the SDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep unauthorized personnel away. Ventilate closed spaces before entering them. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep upwind.

Methods and material for containment and cleaning up: Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use only non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.
7. Handling and storage

Precautions for safe handling: DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Ground and bond container and receiving equipment. Use personal protective equipment as required. Do not get in eyes, on skin, on clothing. Use only with adequate ventilation. Wash hands thoroughly after handling. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use.

Conditions for safe storage, including any incompatibilities: Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

8. Exposure controls/personal protection

Control Parameters

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
<td>REL</td>
<td>250 ppm 590 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td>PEL</td>
<td>1,000 ppm 2,400 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>750 ppm 1,800 mg/m³</td>
<td>US. OSHA Table Z-T-A (29 CFR 1910.1000) (1989)</td>
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</tr>
<tr>
<td>STEL</td>
<td>1,000 ppm 2,400 mg/m³</td>
<td>US. OSHA Table Z-T-A (29 CFR 1910.1000) (1989)</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>250 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2015)</td>
<td></td>
</tr>
<tr>
<td>STEL</td>
<td>500 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2015)</td>
<td></td>
</tr>
</tbody>
</table>

Biological Limit Values

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE (acetone: Sampling time: End of shift,)</td>
<td>25 mg/l (Urine)</td>
<td>ACGIH BEL (03 2015)</td>
</tr>
</tbody>
</table>

Appropriate Engineering Controls

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing and gloves.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with organic vapor cartridge.
Hygiene measures: Provide eyewash station and safety shower. Observe good industrial hygiene practices. Do not eat, drink or smoke when using the product. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Do not get this material in contact with skin. Avoid contact with eyes. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use.

9. Physical and chemical properties

Appearance
- Physical state: liquid
- Form: liquid
- Color: Colorless
- Odor: Sweet, mint-like
- Odor threshold: No data available.
- pH: No data available.
- Melting point/freezing point: -94.7 °C
- Initial boiling point and boiling range: 56 °C (101.3 kPa)
- Flash Point: -20 °C (Closed Cup)
- Evaporation rate: No data available.
- Flammability (solid, gas): Class IB Flammable Liquid

Upper/lower limit on flammability or explosive limits
- Flammability limit - upper (%): 12.8 %(V)
- Flammability limit - lower (%): 2.6 %(V)
- Explosive limit - upper (%): No data available.
- Explosive limit - lower (%): No data available.

Vapor pressure: 30.9 kPa (25 °C)
Vapor density: 2
Relative density: 0.7899 (4 °C)
Solubility(ies)
- Solubility in water: Miscible with water.
- Solubility (other):
  - alcohol: Very Soluble
  - benzene: Soluble
  - chloroform: Very Soluble
  - ether: Very Soluble

Partition coefficient (n-octanol/water): -0.24
Auto-ignition temperature: 869 °F
Decomposition temperature: No data available.
Viscosity: No data available.

Other information
- Liquid conductivity: 0.06 μS/cm
- Molecular weight: 58.08 g/mol (C3H6O)

10. Stability and reactivity

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: Hazardous polymerization does not occur.
Conditions to avoid: Heat, sparks, flames.

Incompatible Materials: Oxidizers, acids

Hazardous Decomposition Products: Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure

Ingestion: Harmful if swallowed.

Inhalation: May cause irritation to the respiratory system.

Skin Contact: Causes mild skin irritation. Prolonged or repeated skin contact may cause drying, cracking, or irritation.

Eye contact: Causes eye irritation.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: LD 50 (Rat): 5,800 mg/kg

Dermal Product: LD 50 (Rabbit): 20,000 mg/kg

Inhalation Product: LC 50 (Rat, 4 h): 76 mg/l

Repeated dose toxicity Product: No data available.

Skin Corrosion/Irritation Product: Prolonged or repeated contact may cause irritation.

Serious Eye Damage/Eye Irritation Product: Irritating to eyes.

Respiratory or Skin Sensitization Product: Not a skin sensitizer.

Carcinogenicity Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens: No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure
Product: Respiratory tract irritation. Narcotic effect.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Fathead minnow (Pimephales promelas), 96 h): 5,490 - 7,030 mg/l Mortality
LC 50 (Bluegill (Lepomis macrochirus), 96 h): 8,300 mg/l Mortality

Aquatic Invertebrates
Product: LC 50 (Brine shrimp (Artemia salina), 24 h): 2,100 mg/l Mortality
LC 50 (Water flea (Daphnia magna), 48 h): 12,100 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: -0.24
Mobility in Soil: No data available.

Other Adverse Effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number: UN 1090
UN Proper Shipping Name: Acetone
Transport Hazard Class(es)
  Class(es): 3
  Label(s): 3
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –

IMDG

UN Number: UN 1090
UN Proper Shipping Name: ACETONE
Transport Hazard Class(es)
  Class(es): 3
  Label(s): 3
  EmS No.: F-E, S-D
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –

IATA

UN Number: UN 1090
Proper Shipping Name: Acetone
Transport Hazard Class(es):
  Class(es): 3
  Label(s): 3
Marine Pollutant: Not a Marine Pollutant
Packing Group: II
Special precautions for user: –

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
<td>5000 lbs.</td>
</tr>
</tbody>
</table>
Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute (Immediate)
Fire

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
<td>5000 lbs.</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
<td>10000 lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

<table>
<thead>
<tr>
<th>Chemical Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
</tr>
</tbody>
</table>

US. Massachusetts RTK - Substance List

<table>
<thead>
<tr>
<th>Chemical Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
</tr>
</tbody>
</table>

US. Pennsylvania RTK - Hazardous Substances

<table>
<thead>
<tr>
<th>Chemical Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
</tr>
</tbody>
</table>

US. Rhode Island RTK

<table>
<thead>
<tr>
<th>Chemical Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETONE</td>
</tr>
</tbody>
</table>
Inventory Status:

Australia AICS: On or in compliance with the inventory
Canada DSL Inventory List: On or in compliance with the inventory
EINECS, ELINCS or NLP: On or in compliance with the inventory
Japan (ENCS) List: On or in compliance with the inventory
China Inv. Existing Chemical Substances: On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
Canada NDSL Inventory: Not in compliance with the inventory.
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Japan ISHL Listing: On or in compliance with the inventory
Japan Pharmacopoeia Listing: Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 06-08-2016
Revision Date: No data available.
Version #: 3.0
Further Information: No data available.
Disclaimer:

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1. Identification

Product identifier: BUFFERED OXIDE ETCH WITH SURFACANT

Other means of identification
Product No.: 5568, 5334, 5332

Recommended use and restriction on use
Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information

Manufacturer
Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax: Contact Person: Environmental Health & Safety
e-mail: info@avantormaterials.com

Emergency telephone number:
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard Classification

Health Hazards
Skin Corrosion/Irritation Category 1B
Serious Eye Damage/Eye Irritation Category 2A

Unknown toxicity
Acute toxicity, oral 50 %
Acute toxicity, dermal 50 %
Acute toxicity, inhalation, vapor 100 %
Acute toxicity, inhalation, dust or mist 100 %

Unknown toxicity
Acute hazards to the aquatic environment 50 %
Chronic hazards to the aquatic environment 50 %

Label Elements
Hazard Symbol:
Signal Word: Danger

Hazard Statement: Causes severe skin burns and eye damage.
Causes serious eye irritation.

Precautionary Statement

Prevention: Do not breathe dust or mists. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing. 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 advice/attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. Specific treatment (see this label). Wash contaminated clothing before reuse.

Storage: Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM FLUORIDE</td>
<td></td>
<td>12125-01-8</td>
<td>40 - 70%</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE</td>
<td></td>
<td>7664-39-3</td>
<td>1 - 5%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth. Never give liquid to an unconscious person. Do not induce vomiting without advice from poison control center. Call a physician or poison control center immediately.

Inhalation: Call a physician or poison control center immediately. Move to fresh air. Apply artificial respiration if victim is not breathing If breathing is difficult, give oxygen.
Skin Contact: Immediately remove contaminated clothing under a shower. Flush exposed areas with large quantities of water for five minutes. Wash carefully behind ears, under nails and in skin folds. Get medical attention immediately. For those providing assistance, avoid further skin contact to yourself and others. Wear HF impervious clothing with face shield or goggles and HF impervious gloves. If available, apply calcium gluconate gel (2.5%) into burn area continuously for 15 minutes or until pain relief. For a larger area, use iced Benzalkonium Chloride 0.13% soaks until pain has resolved at least 30-40 minutes. If calcium gluconate gel or Benzalkonium Chloride is not available, continue to wash exposed areas with water until patient is seen by a physician and is taken to a hospital. Insure that contaminated clothing and shoes are properly bagged and discarded. Insure that jewelry is removed and soaked in calcium gluconate solution to decontaminate.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Causes severe skin and eye burns. May be fatal if swallowed. Fatal if inhaled.

Indication of immediate medical attention and special treatment needed

Treatment: Injection of 5% calcium gluconate is indicated as the primary medical treatment for large burns. If benzalkonium chloride soaks or calcium gluconate gel do not provide significant relief of pain within 30 to 40 minutes, injection of calcium gluconate solution is indicated. For burns of large skin areas (>15%), for ingestion and for significant inhalation exposure, severe systemic effects may occur. Monitor and correct for hypocalcemia, cardiac arrhythmias, hypomagnesemia and hyperkalemia. Calcium supplements are essential for emergency response to large exposures.

5. Fire-fighting measures

General Fire Hazards: In case of fire and/or explosion do not breathe fumes. Product is highly acidic. Wear protective gear if spilled during fire fighting.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Halon. Water. Carbon dioxide

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Product is acidic. Wear appropriate protective gear if spilled during fire fighting. Reacts with most metals to form flammable hydrogen gas. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out. In case of fire and/or explosion do not breathe fumes.
Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Evacuate area. See Section 8 of the MSDS for Personal Protective Equipment. Keep unauthorized personnel away. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Avoid contact with eyes, skin, and clothing. Wash hands thoroughly after handling. Do not taste or swallow. Avoid contact with eyes. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required. Do not get in eyes, on skin, on clothing. Avoid contact with skin.

Conditions for safe storage, including any incompatibilities: No data available.
8. Exposure controls/personal protection

Control Parameters

### Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM FLUORIDE - as F TWA</td>
<td>2.5 mg/m^3</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
<td></td>
</tr>
<tr>
<td>REL</td>
<td>2.5 mg/m^3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
<td></td>
</tr>
<tr>
<td>PEL</td>
<td>2.5 mg/m^3</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>2.5 mg/m^3</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
<td></td>
</tr>
<tr>
<td>AMMONIUM FLUORIDE - Dust. TWA</td>
<td>2.5 mg/m^3</td>
<td>US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE - as F TWA</td>
<td>0.5 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ceiling</td>
<td>2 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE REL</td>
<td>3 ppm</td>
<td>2.5 mg/m^3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>Ceiling</td>
<td>6 ppm</td>
<td>5 mg/m^3</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE - as F PEL</td>
<td>2.5 mg/m^3</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>3 ppm</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE TWA</td>
<td>3 ppm</td>
<td>US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)</td>
<td></td>
</tr>
</tbody>
</table>

### Biological Limit Values

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM FLUORIDE (Fluoride: Sampling time: Prior to shift.)</td>
<td>2 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
<tr>
<td>AMMONIUM FLUORIDE (Fluoride: Sampling time: End of shift.)</td>
<td>3 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE (Fluoride: Sampling time: Prior to shift.)</td>
<td>2 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE (Fluoride: Sampling time: End of shift.)</td>
<td>3 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
</tbody>
</table>

### Appropriate Engineering Controls

No data available.

### Individual protection measures, such as personal protective equipment

#### General information:
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. If exposure limits have not been established, maintain airborne levels to an acceptable level.

#### Eye/face protection:
Wear a full-face respirator, if needed. Wear safety glasses with side shields (or goggles) and a face shield.

#### Skin Protection
**Hand Protection:** Chemical resistant gloves
Other: Wear suitable protective clothing.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with specific cartridge and full facepiece providing protection against the compound of concern.

Hygiene measures: Wash contaminated clothing before reuse. Avoid contact with skin. Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product. Do not eat, drink or smoke when using the product. Wash hands after handling. Avoid contact with eyes. Do not get this material in contact with skin. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Form:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color:</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Odor threshold:</td>
<td>No data available.</td>
</tr>
<tr>
<td>pH:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Melting point/freezing point:</td>
<td>18 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Flash Point:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Flammability (solid, gas):</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

Upper/lower limit on flammability or explosive limits

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability limit - upper (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Flammability limit - lower (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Explosive limit - upper (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor pressure:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor density:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Relative density:</td>
<td>1.10 (20 °C)</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Solubility in water:</td>
<td>Completely Soluble</td>
</tr>
<tr>
<td>Solubility (other):</td>
<td>No data available.</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water):</td>
<td>No data available.</td>
</tr>
<tr>
<td>Auto-ignition temperature:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Viscosity:</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactivity: Reacts violently with strong alkaline substances.

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur. Contact with metals may evolve flammable hydrogen gas.


11. Toxicological information

Information on likely routes of exposure

Ingestion: Toxic if swallowed.

Inhalation: Fatal if inhaled.

Skin Contact: Toxic in contact with skin. Causes severe skin burns. May cause an allergic skin reaction.

Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: No data available.

Dermal Product: No data available.

Inhalation Product: No data available.

Specified substance(s):

HYDROGEN FLUORIDE

- LC 50 (Rat, 15 min): 2689 ppm
- LC 50 (Mouse, 1 h): 500 ppm
- LC 50 (Rat, 1 h): 1278 ppm
- LC 50 (Rat, 30 min): 2042 ppm
- LC 50 (Rat, 5 min): 4970 ppm

Repeated Dose Toxicity Product: No data available.

Skin Corrosion/Irritation Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation Product: Causes serious eye damage.

Respiratory or Skin Sensitization Product: No data available.

Carcinogenicity Product: No data available.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

No carcinogenic components identified

Hazardous Decomposition Products: ammonia Nitrogen Oxides fluorides
Germ Cell Mutagenicity

In vitro
Product: No data available.

In vivo
Product: No data available.

Reproductive Toxicity
Product: No data available.

Specific Target Organ Toxicity - Single Exposure
Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.

Aspiration Hazard
Product: No data available.

Other Effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: There are no data on the degradability of this product.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential

Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Specified substance(s):
AMMONIUM FLUORIDE  Log Kow: -4.37

Mobility in Soil: No data available.

Other Adverse Effects: The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number: UN 2922
UN Proper Shipping Name: Corrosive liquids, toxic, n.o.s.(CONTAINS HYDROFLUORIC ACID, AMMONIUM FLUORIDE)
Transport Hazard Class(es): 8, 6.1
Label(s): 8, 6.1
Packing Group: II
Marine Pollutant: No

IMDG

UN Number: UN 2922
UN Proper Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.(CONTAINS HYDROFLUORIC ACID, AMMONIUM FLUORIDE)
Transport Hazard Class(es): 8, 6.1
Label(s): 8, 6.1
EmS No.: F-A, S-B
Packing Group: II
Marine Pollutant: No

IATA

UN Number: UN 2922
Proper Shipping Name: Corrosive liquid, toxic, n.o.s.(CONTAINS HYDROFLUORIC ACID, AMMONIUM FLUORIDE)
Transport Hazard Class(es): 8, 6.1
Label(s): 8, 6.1
Marine Pollutant: No
Packing Group: II

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.
CERCLA Hazardous Substance List (40 CFR 302.4):
AMMONIUM FLUORIDE  Reportable quantity: 100 lbs.
HYDROGEN FLUORIDE  Reportable quantity: 100 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

- Acute (Immediate)
- Chronic (Delayed)
- Fire
- Reactive
- Pressure Generating

SARA 302 Extremely Hazardous Substance

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>RQ</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN FLUORIDE</td>
<td>100 lbs.</td>
<td>100 lbs.</td>
</tr>
</tbody>
</table>

SARA 304 Emergency Release Notification

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>RQ</th>
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<tbody>
<tr>
<td>AMMONIUM FLUORIDE</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE</td>
<td>100 lbs.</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN FLUORIDE</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>AMMONIUM FLUORIDE</td>
<td>500 lbs.</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for other users</th>
<th>Reporting threshold for manufacturing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM FLUORIDE</td>
<td>10000 lbs.</td>
<td>25000 lbs.</td>
</tr>
<tr>
<td>HYDROGEN FLUORIDE</td>
<td>10000 lbs.</td>
<td>25000 lbs.</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
AMMONIUM FLUORIDE  Reportable quantity: 100 lbs.
HYDROGEN FLUORIDE  Reportable quantity: 100 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
HYDROGEN FLUORIDE  Threshold quantity: 1000 lbs

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act
AMMONIUM FLUORIDE Listed

US. Massachusetts RTK - Substance List
AMMONIUM FLUORIDE Listed
HYDROGEN FLUORIDE Listed

US. Pennsylvania RTK - Hazardous Substances
AMMONIUM FLUORIDE Listed

US. Rhode Island RTK
AMMONIUM FLUORIDE Listed
Inventory Status:

<table>
<thead>
<tr>
<th>Country/Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia AICS</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Canada DSL Inventory List</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>EINECS, ELINCS or NLP</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Japan (ENCS) List</td>
<td>Not in compliance with the inventory</td>
</tr>
<tr>
<td>China Inv. Existing Chemical Substances</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Korea Existing Chemicals Inv. (KECI)</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Canada NDSL Inventory</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Philippines PICCS</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>US TSCA Inventory</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>New Zealand Inventory of Chemicals</td>
<td>On or in compliance with the inventory</td>
</tr>
<tr>
<td>Japan ISHL Listing</td>
<td>Not in compliance with the inventory</td>
</tr>
<tr>
<td>Japan Pharmacopoeia Listing</td>
<td>Not in compliance with the inventory</td>
</tr>
</tbody>
</table>

16. Other information, including date of preparation or last revision

NFPA Hazard ID

Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

Issue Date: 10-23-2014
Revision Date: No data available.
Version #: 1.0
Further Information: No data available.
Disclaimer:

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SAFETY DATA SHEET

1. Identification

Product identifier: HEXAMETHYLDISILAZANE

Other means of identification
Product No.: N152, 5797, 9362, 9352

Recommended use and restriction on use
Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer
Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
          Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax:
Contact Person: Environmental Health & Safety
e-mail: info@avantormaterials.com

Emergency telephone number:
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard classification

Physical hazards
Flammable liquids: Category 2

Health hazards
Acute toxicity (Oral): Category 4
Acute toxicity (Dermal): Category 3
Acute toxicity (Inhalation - vapor): Category 3
Skin corrosion/irritation: Category 1B

Environmental hazards
Acute hazards to the aquatic environment: Category 3

Label elements
Hazard symbol:

Signal word: Danger
Hazard statement: Highly flammable liquid and vapor. Harmful if swallowed. Toxic in contact with skin. Toxic if inhaled. Causes severe skin burns and eye damage. Harmful to aquatic life.

Precautionary statement

Prevention: Keep away from heat/sparks/open flames/hot surfaces. No smoking. Take precautionary measures against static discharge. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid release to the environment.

Response: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEXAMETHYLDISILAZANE</td>
<td>999-97-3</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention if irritation persists after washing. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation persists after washing.

Most important symptoms/effects, acute and delayed

Symptoms: Irritating to eyes, respiratory system and skin.
Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General fire hazards: Highly flammable liquid and vapour. In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical:
Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. Heat may cause the containers to explode.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the MSDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use only non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

Environmental precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid release to the environment.
7. Handling and storage

Precautions for safe handling: DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Wear protective gloves/protective clothing/eye protection/face protection. Use only with adequate ventilation. Wash hands thoroughly after handling. Avoid contact with skin. Avoid contact with eyes. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Do not breathe dust/fume/gas/mist/vapors/spray. Wash contaminated clothing before reuse.

Conditions for safe storage, including any incompatibilities: Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids. Store locked up.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None of the components have assigned exposure limits.

Appropriate engineering controls

No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

Eye/face protection: Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory protection: In case of inadequate ventilation use suitable respirator.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Provide eyewash station and safety shower.

9. Physical and chemical properties

Appearance

Physical state: Liquid
Form: Liquid
Color: Colorless
Odor: Ammonia-like odor
Odor threshold: No data available.
pH: 8.5
Melting point/freezing point: -70 °C
Initial boiling point and boiling range: 125 °C
Flash Point: 14 °C (Closed Cup)
Evaporation rate: < 1 (butyl acetate=1)
Flammability (solid, gas): No data available.
Upper/lower limit on flammability or explosive limits
- Flammability limit - upper (%): 16.3 %(V)
- Flammability limit - lower (%): 0.8 %(V)
- Explosive limit - upper (%): No data available.
- Explosive limit - lower (%): No data available.
Vapor pressure: 1.8 kPa (25 °C)
Vapor density: 4.6
Relative density: 0.77 (20 °C)
Solubility(ies)
- Solubility in water: No data available.
- Solubility (other): No data available.
Partition coefficient (n-octanol/water): 2.62
Auto-ignition temperature: 325 °C
Decomposition temperature: No data available.
Viscosity: 0.90 mm2/s
Other information
- Molecular weight: 161.4 g/mol (C6H19NSi2)

10. Stability and reactivity
Reactivity: No dangerous reaction known under conditions of normal use.
Chemical stability: Material is stable under normal conditions.
Possibility of hazardous reactions: Hazardous polymerization does not occur.
Hazardous decomposition products: Fire or excessive heat may produce hazardous decomposition products. Formaldehyde. Oxides of Carbon. Nitrogen Oxides

11. Toxicological information
Information on likely routes of exposure
- Ingestion: Harmful if swallowed.
- Inhalation: Toxic if inhaled.
- Skin contact: Toxic in contact with skin. Causes severe skin burns.
- Eye contact: Causes serious eye damage.
Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: LD 50 (Rat): 847 mg/kg
          LD 50 (Mouse): 850 mg/kg

Dermal
Product: No data available.

Inhalation
Product: LC 50 (Rat, 4 h): 8.7 mg/l
          LC 50 (Mouse, 2 h): 12 mg/l

Repeated dose toxicity
Product: No data available.

Skin corrosion/irritation
Product: Toxic in contact with skin. Causes severe skin burns.

Serious eye damage/eye irritation
Product: Causes serious eye damage.

Respiratory or skin sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

No carcinogenic components identified

Germ cell mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific target organ toxicity - single exposure
Product: No data available.

Specific target organ toxicity - repeated exposure
Product: No data available.

Aspiration hazard
Product: Not classified

Other effects: None known.
12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:
- Fish
  Product: No data available.
- Aquatic invertebrates
  Product: No data available.

Chronic hazards to the aquatic environment:
- Fish
  Product: No data available.
- Aquatic invertebrates
  Product: No data available.
- Toxicity to Aquatic Plants
  Product: No data available.

Persistence and degradability

Biodegradation
Product: There are no data on the degradability of this product.

BOD/COD ratio
Product: No data available.

Bioaccumulative potential

Bioconcentration factor (BCF)
Product: No data available on bioaccumulation.

Partition coefficient n-octanol / water (log Kow)
Product: Log Kow: 2.62

Mobility in soil: No data available.

Other adverse effects: Harmful to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.
14. Transport information

DOT
- UN number: UN 3286
- UN proper shipping name: Flammable liquid, toxic, corrosive, n.o.s. (HEXAMETHYLDISILAZANE)
- Transport hazard class(es):
  - Class(es): 3, 6.1, 8
  - Label(s): 3, 6.1, 8
- Packing group: II
- Marine Pollutant: No

IMDG
- UN number: UN 3286
- UN proper shipping name: FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (HEXAMETHYLDISILAZANE)
- Transport hazard class(es):
  - Class(es): 3, 6.1, 8
  - Label(s): 3, 6.1, 8
  - EmS No.: F-E, S-C
- Packing group: II
- Marine Pollutant: No

IATA
- UN number: UN 3286
- Proper Shipping Name: Flammable liquid, toxic, corrosive, n.o.s. (HEXAMETHYLDISILAZANE)
- Transport hazard class(es):
  - Class(es): 3, 6.1, 8
  - Label(s): 3, 6.1, 8
- Marine Pollutant: No
- Packing group: II

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4): None present or none present in regulated quantities.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories
- Acute (Immediate) [x]
- Chronic (Delayed) [x]
- Fire [x]
- Reactive
- Pressure Generating

SARA 302 Extremely hazardous substance
None present or none present in regulated quantities.

SARA 304 Emergency release notification
None present or none present in regulated quantities.
SARA 311/312 Hazardous chemical
Chemical identity       Threshold Planning Quantity
HEXAMETHYLDISILAZAN   500 lbs

SARA 313 (TRI reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US state regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act
HEXAMETHYLDISILAZANE  Listed

US. Massachusetts RTK - Substance List
No ingredient regulated by MA Right-to-Know Law present.

US. Pennsylvania RTK - Hazardous Substances
No ingredient regulated by PA Right-to-Know Law present.

US. Rhode Island RTK
No ingredient regulated by RI Right-to-Know Law present.

Inventory Status:
Australia AICS: On or in compliance with the inventory
Canada DSL Inventory List: On or in compliance with the inventory
EINECS, ELINCS or NLP: On or in compliance with the inventory
Japan (ENCS) List: On or in compliance with the inventory
China Inv. Existing Chemical Substances: Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI): Not in compliance with the inventory.
Canada NDSL Inventory: On or in compliance with the inventory
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Japan ISHL Listing: On or in compliance with the inventory
Japan Pharmacopoeia Listing: Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Health</th>
<th>Reactivity</th>
<th>Special hazard.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
The information presented in this Material Safety Data Sheet (MSDS/SDS) was prepared by technical personnel based on data that they believe in their good faith judgment is accurate. However, the information provided herein is provided “as is,” and Avantor Performance Materials makes and gives no representations or warranties whatsoever, and expressly disclaims all warranties regarding such information and the product to which it relates, whether express, implied, or statutory, including without limitation warranties of accuracy, completeness, merchantability, non-infringement, performance, safety, suitability, stability, and fitness for a particular purpose, and any warranties arising from course of dealing, course of performance, or usage of trade. This MSDS/SDS is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product, and is not intended to be comprehensive as to the manner and conditions of use, handling, storage, or disposal of the product. Individuals receiving this MSDS/SDS must always exercise their own independent judgment in determining the appropriateness of such issues. Accordingly, Avantor Performance Materials assumes no liability whatsoever for the use of or reliance upon this information. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any federal, state, local, or foreign laws. Avantor Performance Materials reminds you that it is your legal duty to make all information in this MSDS/SDS available to your employees.
1. Identification

**Product identifier:** HYDROCHLORIC ACID

**Other means of identification**

**Synonyms:** Muriatic Acid, Hydrogen Chloride, Aqueous

**Product No.:** 9385, 9538, 9165, V226, V187, V078, V001, 6900, 2624, 2515, H999, H987, H616, 5861, 2062, 5814, 2626, 2612, 5800, 9625, 5587, 9551, 9544, 9539, 9535, 9530, 9529, 5367, H613, 37825, 25496, 20620, H613

**Recommended use and restriction on use**

**Recommended use:** Not available.
**Restrictions on use:** Not known.

**Manufacturer/Importer/Supplier/Distributor Information**

**Manufacturer**

**Company Name:** Avantor Performance Materials, Inc.
**Address:** 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034
**Telephone:** Customer Service: 855-282-6867
**Fax:**
**Contact Person:** Environmental Health & Safety
**e-mail:** info@avantormaterials.com

**Emergency telephone number:**

24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

2. Hazard(s) identification

**Hazard Classification**

**Physical Hazards**

- Corrosive to metals: Category 1

**Health Hazards**

- Acute toxicity (Oral): Category 4
- Skin Corrosion/Irritation: Category 1
- Serious Eye Damage/Eye Irritation: Category 1
- Specific Target Organ Toxicity - Single Exposure (Inhalation - vapor): Category 3

**Label Elements**

**Hazard Symbol:**

- 

**Signal Word:** Danger
Hazard Statement: May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. May cause respiratory irritation.

Precautionary Statement

Prevention: Keep only in original container. Wash thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well- ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product.

Response: Absorb spillage to prevent material damage. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

Storage: Store locked up. Store in a well- ventilated place. Keep container tightly closed. Store in corrosive resistant container with a resistant inner liner.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td></td>
<td>7647-01-0</td>
<td>20 - 40%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Causes severe skin and eye burns. Harmful if swallowed.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: No data available.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: The product is non-combustible. Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Fire or excessive heat may produce hazardous decomposition products.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Ventilate closed spaces before entering them. Keep unauthorized personnel away. Evacuate area. Keep upwind. See Section 8 of the SDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Neutralize with lime or soda ash. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Do not eat, drink or smoke when using the product. Do not get in eyes, on skin, on clothing. Wash hands thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use caution when adding this material to water.
Conditions for safe storage, including any incompatibilities:
Keep container tightly closed. Store in a well-ventilated place. Unsuitable containers: metals.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td>Ceiling</td>
<td>2 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td></td>
<td>Cell, Time</td>
<td>5 ppm 7 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>Ceiling</td>
<td>5 ppm 7 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>Ceiling</td>
<td>5 ppm 7 mg/m³</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
</tr>
</tbody>
</table>

Appropriate Engineering Controls
No data available.

Individual protection measures, such as personal protective equipment

General information:
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection:
Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection
Hand Protection: Chemical resistant gloves
Other: Wear suitable protective clothing and gloves.

Respiratory Protection:
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures:
Provide eyewash station and safety shower. Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product. Do not get in eyes. Wash contaminated clothing before reuse. Do not get this material in contact with skin.

9. Physical and chemical properties

Appearance

Physical state: Liquid
Form: Liquid
Color: Colorless
Odor: Pungent
Odor threshold: No data available.

pH: 0.1 (1 N aqueous solution)
Melting point/freezing point: -35 °C

SDS_US - SDSMIX000520
10. Stability and reactivity

Reactivity: Reacts violently with strong alkaline substances.

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur.

Conditions to Avoid: Avoid contact with strong reducing agents. Strong oxidizing agents. Contact with alkalis.


Hazardous Decomposition Products: Chlorine. Hydrogen chloride By heating and fire, corrosive vapors/gases may be formed.

11. Toxicological information

Information on likely routes of exposure

Ingestion: Harmful if swallowed.

Inhalation: Causes severe burns.

Skin Contact: Causes severe skin burns.

Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: ATEmix (Rat): 581 mg/kg

Dermal Product: No data available.

Specified substance(s):
HYDROCHLORIC ACID

Inhalation
Product: No data available.

Specified substance(s):
HYDROCHLORIC ACID
LD 50 (Mouse): 1,449 mg/kg

Repeated Dose Toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye damage.

Respiratory or Skin Sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens: No carcinogenic components identified


Germ Cell Mutagenicity
In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive Toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: Not classified

Other Effects: None known.

12. Ecological information

Ecotoxicity:
Acute hazards to the aquatic environment:
Fish
Product: No data available.

Specified substance(s): HYDROCHLORIC ACID
LC 50 (Western mosquitofish (Gambusia affinis), 96 h): 282 mg/l Mortality

Aquatic Invertebrates
Product: No data available.

Specified substance(s): HYDROCHLORIC ACID
LC 50 (Green or European shore crab (Carcinus maenas), 48 h): 240 mg/l Mortality
LC 50 (Common shrimp, sand shrimp (Crangon crangon), 48 h): 260 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in Soil: The product is water soluble and may spread in water systems.

Other Adverse Effects: Large amounts of the product may affect the acidity (pH-factor) in water with possible risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws. Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated Packaging: No data available.
14. Transport information

**DOT**
- UN Number: UN 1789
- UN Proper Shipping Name: Hydrochloric acid
- Transport Hazard Class(es): 8
- Label(s): 8
- Packing Group: II
- Marine Pollutant: No

**IMDG**
- UN Number: UN 1789
- UN Proper Shipping Name: HYDROCHLORIC ACID
- Transport Hazard Class(es): 8
- Label(s): 8
- EmS No.: F-A, S-B
- Packing Group: II
- Marine Pollutant: No

**IATA**
- UN Number: UN 1789
- Proper Shipping Name: Hydrochloric acid
- Transport Hazard Class(es): 8
- Label(s): 8
- Marine Pollutant: No
- Packing Group: II

15. Regulatory information

**US Federal Regulations**

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**
- US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
  - None present or none present in regulated quantities.

**CERCLA Hazardous Substance List (40 CFR 302.4):**
- HYDROCHLORIC ACID Reportable quantity: 5000 lbs.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**
- [X] Acute (Immediate) □ Chronic (Delayed) □ Fire □ Reactive □ Pressure Generating

**SARA 302 Extremely Hazardous Substance**
- Chemical Identity: HYDROCHLORIC ACID
- RQ: 5000 lbs.
- Threshold Planning Quantity: 500 lbs.

**SARA 304 Emergency Release Notification**
- Chemical Identity: HYDROCHLORIC ACID
- RQ: 5000 lbs.
SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td>500lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for other users</th>
<th>Reporting threshold for manufacturing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td>10000 lbs</td>
<td>25000 lbs.</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

HYDROCHLORIC ACID
Reportable quantity: 5000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

HYDROCHLORIC ACID
Threshold quantity: 15000 lbs

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act
HYDROCHLORIC ACID
Listed

US. Massachusetts RTK - Substance List
HYDROCHLORIC ACID
Listed

US. Pennsylvania RTK - Hazardous Substances
HYDROCHLORIC ACID
Listed

US. Rhode Island RTK
HYDROCHLORIC ACID
Listed

Inventory Status:

Australia AICS:
On or in compliance with the inventory

Canada DSL Inventory List:
On or in compliance with the inventory

EU EINECS List:
On or in compliance with the inventory

EU ELINCS List:
Not in compliance with the inventory.

Japan (ENCS) List:
On or in compliance with the inventory

EU No Longer Polymers List:
Not in compliance with the inventory.

China Inv. Existing Chemical Substances:
On or in compliance with the inventory

Korea Existing Chemicals Inv. (KECI):
On or in compliance with the inventory

Canada NDSL Inventory:
Not in compliance with the inventory.

Philippines PICCS:
On or in compliance with the inventory

US TSCA Inventory:
On or in compliance with the inventory

New Zealand Inventory of Chemicals:
On or in compliance with the inventory

Switzerland Consolidated Inventory:
Not in compliance with the inventory.

Japan ISHL Listing:
Not in compliance with the inventory.

Japan Pharmacopoeia Listing:
Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID

Flammability: 3

Acidity: 1
Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

Issue Date: 02-02-2015
Revision Date: No data available.
Version #: 4.0
Further Information: No data available.

Disclaimer:
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SAFETY DATA SHEET

1. Identification

Product identifier: HYDROGEN PEROXIDE

Other means of identification
Product No.: 5803, 5170, 3664, V340, 2192, 2204, 2203, 2202, 2201, 2200, 2190, 2189, 2186, 5236, 5853, 5846, 5816, 2002, 5516, 5369, 5240, 5155, 37818, 37817, 37810

Recommended use and restriction on use
Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer
Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax:
Contact Person: Environmental Health & Safety
e-mail: info@avantormaterials.com

Emergency telephone number:
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard classification

Physical hazards
Oxidizing liquids Category 2

Health hazards
Acute toxicity (Oral) Category 4
Acute toxicity (Inhalation - vapor) Category 3
Skin corrosion/irritation Category 1
Serious eye damage/eye irritation Category 1
Germ cell mutagenicity Category 1B
Specific target organ toxicity - single exposure Category 1
Specific target organ toxicity - single exposure Category 3

Environmental hazards
Acute hazards to the aquatic environment Category 2

Label elements
Hazard symbol:
Signal word: Danger

Hazard statement: May intensify fire; oxidizer. Toxic if inhaled. Harmful if swallowed. Causes severe skin burns and eye damage. May cause respiratory irritation. May cause genetic defects. Causes damage to organs if swallowed. Toxic to aquatic life.

Precautionary statement

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat. - No smoking. Keep/Store away from clothing/combustible materials. Take any precaution to avoid mixing with combustibles. Wash thoroughly after handling. Do not breathe dust/mist/vapors. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. IF exposed: Call a POISON CENTER or doctor/physician. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

Storage: Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN PEROXIDE</td>
<td></td>
<td>7722-84-1</td>
<td>25 - 35%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures
General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. If breathing is difficult, give oxygen. Apply artificial respiration if victim is not breathing.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Harmful if swallowed. Toxic if inhaled. Corrosive to skin and eyes.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General fire hazards: Strong oxidizer - contact with other material may cause fire.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Strong oxidizer. Contact with combustible material may cause fire. Pressurized container may explode when exposed to heat or flame.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Use water spray to keep fire-exposed containers cool. Fight fire from a protected location. Move containers from fire area if you can do so without risk.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures
Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Use personal protective equipment. Ventilate closed spaces before entering them. See Section 8 of the MSDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Eliminate all ignition sources if safe to do so. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required. Wash hands thoroughly after handling. Do not get in eyes, on skin, on clothing. Keep away from combustible material. Do not taste or swallow. Do not eat, drink or smoke when using the product. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight.

Conditions for safe storage, including any incompatibilities: Keep away from heat. Keep away from sources of ignition - No smoking. Keep away from combustible material. Keep container tightly closed. Store in a well-ventilated place. Store in a dry place.

8. Exposure controls/personal protection

Control parameters

<table>
<thead>
<tr>
<th>Chemical identity</th>
<th>Type</th>
<th>Exposure Limit values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN PEROXIDE</td>
<td>TWA</td>
<td>1 ppm</td>
<td>US, ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td></td>
<td>REL</td>
<td>1 ppm 1.4 mg/m³</td>
<td>US, NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>1 ppm 1.4 mg/m³</td>
<td>US, OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1 ppm 1.4 mg/m³</td>
<td>US, OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
</tr>
</tbody>
</table>

Appropriate engineering controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection
Hand protection: Chemical resistant gloves

Other: Wear appropriate clothing to prevent reasonably probable skin contact.

Respiratory protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

**Appearance**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild pungent</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available.</td>
</tr>
<tr>
<td>pH</td>
<td>3.3</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-25 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>108 °C</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1 (butyl acetate=1)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

**Upper/lower limit on flammability or explosive limits**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability limit - upper (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Flammability limit - lower (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Explosive limit - upper (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>3.33 kPa</td>
</tr>
<tr>
<td>Vapor density</td>
<td>1.17</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.11 (20 °C)</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Miscible with water.</td>
</tr>
<tr>
<td>Solubility (other)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

**Reactivity:** No dangerous reaction known under conditions of normal use.

**Chemical stability:** Stable; however, may decompose if heated.

**Possibility of hazardous reactions:** Hazardous polymerization does not occur.

**Conditions to avoid:** Heat. Light. Contact with combustibles. Contact with incompatible materials.

**Incompatible materials:** Organic compounds. Reducing agents. Flammable/combustible material.
### Hazardous decomposition products:
May decompose upon heating to produce corrosive and/or toxic fumes.

### 11. Toxicological information

#### Information on likely routes of exposure

- **Ingestion:** May cause burns of the gastrointestinal tract if swallowed.
- **Inhalation:** May cause irritation to the respiratory system.
- **Skin contact:** Causes severe skin burns.
- **Eye contact:** Causes serious eye damage.

#### Information on toxicological effects

- **Acute toxicity (list all possible routes of exposure)**
  - **Oral**
    - **Product:** No data available.
  - **Dermal**
    - **Product:** LD 50 (Rat, Male): 1,193 mg/kg
      - LD 50 (Rat, Female): 1,270 mg/kg
  - **Inhalation**
    - **Product:** No data available.
  - **Repeated dose toxicity**
    - **Product:** No data available.
  - **Skin corrosion/irritation**
    - **Product:** Causes skin burns.
  - **Serious eye damage/eye irritation**
    - **Product:** Causes eye burns.
  - **Respiratory or skin sensitization**
    - **Product:** Not a skin sensitizer.
  - **Carcinogenicity**
    - **Product:** Suspected of causing cancer.
      - **IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**
        - No carcinogenic components identified
      - **US. National Toxicology Program (NTP) Report on Carcinogens:**
        - No carcinogenic components identified
      - **US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**
        - No carcinogenic components identified
  - **Germ cell mutagenicity**
    - **In vitro**
      - **Product:** May cause genetic defects.
    - **In vivo**
      - **Product:** May cause genetic defects.
  - **Reproductive toxicity**
Product: No components toxic to reproduction

Specific target organ toxicity - single exposure
Product: Lungs. Respiratory tract irritation.

Specific target organ toxicity - repeated exposure
Product: None known.

Aspiration hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Specified substance(s):
HYDROGEN PEROXIDE
LC 50 (Chameleon goby (Tridentiger trigonocephalus), 24 h): 155 mg/l Mortality
LC 50 (Jack Mackerel (Trachurus japonicus), 24 h): 89 mg/l Mortality

Aquatic invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration factor (BCF)
Product: No data available on bioaccumulation.

Partition coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil:
The product is water soluble and may spread in water systems.

Other adverse effects: Toxic to aquatic life.

13. Disposal considerations
Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

**DOT**
- UN number: UN 2014
- UN proper shipping name: Hydrogen peroxide, aqueous solutions
- Transport hazard class(es): 5.1, 8
- Label(s): 5.1, 8
- Packing group: II
- Marine Pollutant: No

**IMDG**
- UN number: UN 2014
- UN proper shipping name: HYDROGEN PEROXIDE, AQUEOUS SOLUTION
- Transport hazard class(es): 5.1, 8
- Label(s): 5.1, 8
- EmS No.: F-H, S-Q
- Packing group: II
- Marine Pollutant: No

**IATA**
- UN number: UN 2014
- Proper Shipping Name: Hydrogen peroxide, aqueous solution
- Transport hazard class(es): 5.1, 8
- Label(s): 5.1, 8
- Marine Pollutant: No
- Packing group: II

15. Regulatory information

**US federal regulations**

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

**CERCLA Hazardous Substance List (40 CFR 302.4):**
None present or none present in regulated quantities.

**Superfund amendments and reauthorization act of 1986 (SARA)**

**Hazard categories**
- ✗ Acute (Immediate)
- ✗ Chronic (Delayed)
- ✗ Fire
- ✗ Reactive
- ✗ Pressure Generating

**SARA 302 Extremely hazardous substance**

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>RQ</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN PEROXIDE</td>
<td>1000 lbs.</td>
<td>1000 lbs.</td>
</tr>
</tbody>
</table>

SDS_US - SDSMIX000510 8/10
SARA 304 Emergency release notification
Chemical identity RQ
HYDROGEN PEROXIDE

SARA 311/312 Hazardous chemical
Chemical identity Threshold Planning Quantity
HYDROGEN PEROXIDE 500lbs

SARA 313 (TRI reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US state regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act
HYDROGEN PEROXIDE Listed

US. Massachusetts RTK - Substance List
HYDROGEN PEROXIDE Listed

US. Pennsylvania RTK - Hazardous Substances
HYDROGEN PEROXIDE Listed

US. Rhode Island RTK
HYDROGEN PEROXIDE Listed

Inventory Status:
- Australia AICS: On or in compliance with the inventory
- Canada DSL Inventory List: On or in compliance with the inventory
- EU EINECS List: On or in compliance with the inventory
- EU ELINCS List: Not in compliance with the inventory.
- Japan (ENCS) List: On or in compliance with the inventory
- EU No Longer Polymers List: Not in compliance with the inventory.
- China Inv. Existing Chemical Substances: On or in compliance with the inventory
- Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
- Canada NDSL Inventory: Not in compliance with the inventory.
- Philippines PICCS: On or in compliance with the inventory
- US TSCA Inventory: On or in compliance with the inventory
- New Zealand Inventory of Chemicals: On or in compliance with the inventory
- Switzerland Consolidated Inventory: Not in compliance with the inventory.
- Japan ISHL Listing: Not in compliance with the inventory.
- Japan Pharmacopoeia Listing: On or in compliance with the inventory

16. Other information, including date of preparation or last revision

NFPA Hazard ID

0 1
3 OX

Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
OXY: Oxidizer

Issue date: 06-11-2014
Revision date: No data available.
Version #: 1.1
Further information: No data available.

Disclaimer:
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1 Identification of the substance/mixture and of the company

- **Product identifier**
- **Trade name:** LOR B Series Resists
- **Product number:**
  G316702, G316703, G316704, G316707, G316708, G316710, G316711, G316712, G316715,
  G316716, G316719
- **Application of the substance / the mixture** Photoresist
- **Details of the supplier of the safety data sheet**
  - **Manufacturer/Supplier:**
    MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA
  - **Information department:**
    Product Safety
    Email: productsafety@microchem.com
  - **Emergency telephone number:**
    MicroChem Corp: 617-965-5511
    Chemtrec USA Emergency: 800-424-9300
    Chemtrec International Emergency: 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**
  - **GHS02 Flame**
    Flam. Liq. 3  H226  Flammable liquid and vapor.
  - **GHS07**
    Skin Irrit. 2  H315  Causes skin irritation.
    Eye Irrit. 2A  H319  Causes serious eye irritation.

- **Label elements**
  - **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
  - **Hazard pictograms**
    - GHS02
    - GHS07

- **Signal word** Warning
- **Hazard-determining components of labeling:**
  - Cyclopentanone
- **Hazard statements**
  - H226 Flammable liquid and vapor.
  - H315 Causes skin irritation.
  - H319 Causes serious eye irritation.
- **Precautionary statements**
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

(Contd. on page 2)
Trade name: LOR B Series Resists

42.0.9

P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P233 Keep container tightly closed.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER/doctor if you feel unwell.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· Classification system:
· NFPA ratings (scale 0 - 4)
  Health = 2
  Fire = 3
  Reactivity = 0
· HMIS-ratings (scale 0 - 4)
  HEALTH Health = 2
  FIRE Fire = 3
  REACTIVITY Reactivity = 0
· Other hazards
· Results of PBT and vPvB assessment
  · PBT: Not applicable.
  · vPvB: Not applicable.

3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Description: Mixture of the substances listed below with nonhazardous additions.

· Dangerous components:

  120-92-3 Cyclopentanone
  Flam. Liq. 3, H226; Acute Tox. 4, H302; Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319
  65-90%

  101-98-2 1-methoxy-2-propanol
  Flam. Liq. 3, H226; STOT SE 3, H336
  10-15%

· Additional Components:

  102322-80-3 Polyaliphatic imide copolymer
  Skin Irrit. 2, H315; Eye Irrit. 2A, H319
  1-20%

  Proprietary Dye B
  Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2A, H319
  0.1-2%

4 First-aid measures

· Description of first aid measures
· General information: Immediately remove any clothing soiled by the product.
After inhalation:
Supplement fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

After skin contact:
Immediately wash with water and soap and rinse thoroughly.

After eye contact:
Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.

After swallowing:
Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.

Information for doctor:
Most important symptoms and effects, both acute and delayed: No further relevant information available.

Indication of any immediate medical attention and special treatment needed: Treat symptomatically.

5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents:
- Alcohol resistant foam
- Fire-extinguishing powder
- Carbon dioxide

For safety reasons unsuitable extinguishing agents:
- Water with full jet
- Water

Special hazards arising from the substance or mixture:
Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.

Advice for firefighters:
Protective equipment: Wear SCBA.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures:
- Wear protective equipment. Keep unprotected persons away.
- Ensure adequate ventilation
- Keep away from ignition sources

Environmental precautions:
- Do not allow to enter sewers/surface or ground water.

Methods and material for containment and cleaning up:
- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- Ensure adequate ventilation.
- Do not flush with water or aqueous cleansing agents

Reference to other sections:
- See Section 7 for information on safe handling.
- See Section 8 for information on personal protection equipment.
- See Section 13 for disposal information.
7 Handling and storage

· **Handling:**
  · **Precautions for safe handling**
    Ensure good ventilation/exhaust at the workplace.
    Prevent formation of aerosols.
    Keep away from heat and direct sunlight.
    Use only under yellow light
  · **Information about protection against explosions and fires:**
    Keep ignition sources away - Do not smoke.
    Use explosion-proof apparatus / fittings and spark-proof tools.
    Protect against electrostatic charges.

· **Conditions for safe storage, including any incompatibilities**

· **Storage:**
  · **Requirements to be met by storerooms and containers:**
    Store in a cool location.
    Due to photo-sensitivity, store product in brown-glass or stainless steel receptacles.
  · **Information about storage in one common storage facility:**
    Do not store together with oxidizing and acidic materials.
    Do not store together with alkalis (caustic solutions).
  · **Further information about storage conditions:**
    Keep container well-sealed in cool, dry location.
    Store receptacle in a well ventilated area.
    Protect from heat and direct sunlight.

· **Specific end use(s)**
  No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:**
  No further data; see item 7.

· **Control parameters**

<table>
<thead>
<tr>
<th>Components with limit values that require monitoring at the workplace:</th>
</tr>
</thead>
<tbody>
<tr>
<td>107-98-2 1-methoxy-2-propanol</td>
</tr>
<tr>
<td>REL</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>TLV</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**
  Keep away from food and beverages.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Avoid contact with the eyes and skin.

· **Respiratory equipment:**
  In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.

(Contd. on page 5)
9 Physical and chemical properties

- **Information on basic physical and chemical properties**
  - **General Information**
  - **Appearance:**
    - Form: Liquid
    - Color: Yellow-brown
  - **Odor:** Sweet
  - **Odor threshold:** Not determined.
  - **pH-value:** Not determined.

- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 120 °C (248 °F)

- **Flash point:** 30 °C (86 °F)

- **Flammability (solid, gaseous):** Not applicable.

- **Ignition temperature:** 270 °C (518 °F)

- **Decomposition temperature:** Not determined.

- **Auto igniting:** Product is not selfigniting.

- **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

- **Explosion limits:**
  - **Lower:** 2.3 Vol %
  - **Upper:** Not determined.

- **Vapor pressure at 20 °C (68 °F):** 12 hPa (9 mm Hg)

- **Density:** Not determined.

- **Relative density**
  - See Table 1 Other Information

- **Vapor density**
  - Not determined.

- **Evaporation rate**
  - Not determined.

- **Solubility in / Miscibility with**
  - **Water:** Water miscible No
Trade name: LOR B Series Resists

- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - Dynamic: Not determined.
  - Kinematic: Not determined.
- **Other information**

Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Sp. Grav.</th>
<th>Vol.(%by wt.)</th>
<th>VOC(g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOR 0.7B</td>
<td>G316702</td>
<td>0.965</td>
<td>98</td>
<td>40</td>
</tr>
<tr>
<td>LOR 1B</td>
<td>G316703</td>
<td>0.967</td>
<td>96</td>
<td>930</td>
</tr>
<tr>
<td>LOR 2B</td>
<td>G316704</td>
<td>0.973</td>
<td>95</td>
<td>930</td>
</tr>
<tr>
<td>LOR 3B</td>
<td>G316707</td>
<td>0.980</td>
<td>93</td>
<td>920</td>
</tr>
<tr>
<td>LOR 5B</td>
<td>G316708</td>
<td>0.982</td>
<td>92</td>
<td>910</td>
</tr>
<tr>
<td>LOR 6B</td>
<td>G316709</td>
<td>0.984</td>
<td>91</td>
<td>900</td>
</tr>
<tr>
<td>LOR 7B</td>
<td>G316710</td>
<td>0.988</td>
<td>91</td>
<td>900</td>
</tr>
<tr>
<td>LOR 10B</td>
<td>G316711</td>
<td>0.990</td>
<td>89</td>
<td>880</td>
</tr>
<tr>
<td>LOR 15B</td>
<td>G316712</td>
<td>0.992</td>
<td>88</td>
<td>870</td>
</tr>
<tr>
<td>LOR 20B</td>
<td>G316715</td>
<td>1.002</td>
<td>86</td>
<td>860</td>
</tr>
<tr>
<td>LOR 30B</td>
<td>G316716</td>
<td>1.004</td>
<td>85</td>
<td>850</td>
</tr>
<tr>
<td>LOR 50B</td>
<td>G316719</td>
<td>1.007</td>
<td>82</td>
<td>830</td>
</tr>
</tbody>
</table>

### 10 Stability and reactivity

- **Reactivity:** No further relevant information available.
- **Chemical stability:** Stable under normal use conditions.
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid**
  Heat, flames and sparks. Extremes of temperature and direct sunlight.
  Contact with incompatible materials.
- **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products:**
  Carbon monoxide and carbon dioxide
  Nitrogen oxides (NOx)

### 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity**

- **LD/LC50 values that are relevant for classification:**

#### 120-92-3 Cyclopentanone

<table>
<thead>
<tr>
<th>Route</th>
<th>LD/LC50</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>LD50</td>
<td>1180 mg/kg (Rat)</td>
</tr>
<tr>
<td>Dermal</td>
<td>LD50</td>
<td>&gt;2000 mg/kg (rabbit)</td>
</tr>
<tr>
<td>Inhalative</td>
<td>LC50/4 h</td>
<td>&gt;19.5 mg/l (Rat)</td>
</tr>
</tbody>
</table>

#### 107-98-2 1-methoxy-2-propanol

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>3660 mg/kg (Rat)</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>13000 mg/kg (rabbit)</td>
<td></td>
</tr>
<tr>
<td>Inhalative</td>
<td>54.6 mg/l (Rat)</td>
<td></td>
</tr>
</tbody>
</table>
Safety Data Sheet
acc. to OSHA HCS

Trade name: LOR B Series Resists

<table>
<thead>
<tr>
<th>102322-80-5 Polyaliphatic imide copolymer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
</tr>
<tr>
<td>Dermal LD50</td>
</tr>
</tbody>
</table>

· Primary irritant effect:
  · on the skin: Irritant to skin and mucous membranes.
  · on the eye: Irritating effect.
  · Sensitization: No sensitizing effects known.
  · Experience with humans: No further relevant information available.
  · Additional toxicological information:
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant

· Carcinogenic categories
  · IARC (International Agency for Research on Cancer)
    None of the ingredients are listed.
  · NTP (National Toxicology Program)
    None of the ingredients are listed.
  · OSHA-Ca (Occupational Safety & Health Administration)
    None of the ingredients are listed.

12 Ecological information

· Aquatic toxicity:
  120-92-3 Cyclopentanone
    | EC50/48 h | 100 mg/l (daphnia magna) |
    | EC50/72 h | >100 mg/l (scenedesmus subspicatus) |
    | LC50/96 h | >100 mg/l (fish) |
  107-98-2 1-methoxy-2-propanol
    | EC50/96 h | 23300 mg/l (daphnia magna) |
    |           | >1000 mg/l (green algae) |
    | LC50/96 h | 20800 mg/l (Pimephales promelas) |

· Persistence and degradability
  No further relevant information available.

· Behavior in environmental systems:
  · Bioaccumulative potential
    No further relevant information available.
  · Mobility in soil
    No further relevant information available.

· Additional ecological information:
  · General notes:
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

· Results of PBT and vPvB assessment
  · PBT: Not applicable.
  · vPvB: Not applicable.

· Other adverse effects
  No further relevant information available.
13 Disposal considerations

- Waste treatment methods
  - Recommendation:
    Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
    Disposal must be made in accordance with Federal, State, and Local regulations.

- Uncleaned packagings:
  - Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA: UN1866

- UN proper shipping name
  - DOT, IMDG, IATA: RESIN SOLUTION
  - ADR: 1866 RESIN SOLUTION

- Transport hazard class(es)
  - DOT
    - Class: 3 Flammable liquids
    - Label: 3

  - ADR, IMDG, IATA
    - Class: 3 Flammable liquids
    - Label: 3

- Packing group
  - DOT, ADR, IMDG, IATA: III

- Environmental hazards:
  - Marine pollutant: No

- Special precautions for user
  - Warning: Flammable liquids
  - Danger code (Kemler): 33
  - EMS Number: F-E,S-E

- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
  - Not applicable.

- UN "Model Regulation":
  - UN1866, RESIN SOLUTION, 3, III
15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Sara
    - Section 355 (extremely hazardous substances):
      None of the ingredients are listed.
    - Section 313 (Specific toxic chemical listings):
      None of the ingredients is listed.
    - TSCA (Toxic Substances Control Act):
      All ingredients are listed or comply with TSCA regulations.
  
- Proposition 65
  - Chemicals known to cause cancer:
    None of the ingredients are listed.
  - Chemicals known to cause reproductive toxicity for females:
    None of the ingredients are listed.
  - Chemicals known to cause reproductive toxicity for males:
    None of the ingredients are listed.
  - Chemicals known to cause developmental toxicity:
    None of the ingredients are listed.

- Carcinogenic categories
  - EPA (Environmental Protection Agency)
    None of the ingredients are listed.
  - TLV (Threshold Limit Value established by ACGIH)
    None of the ingredients are listed.
  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    None of the ingredients are listed.

- Massachusetts State Right To Know List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- New Jersey State Right To Know List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- Pennsylvania Hazardous Substances List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- California SCAQMD Rule 443.1 VOC's: See Table 1 - Section 9

- GHS label elements
  - The product is classified and labeled according to the Globally Harmonized System (GHS).
  - Hazard pictograms

GHS02 GHS07
Trade name: LOR B Series Resists

· Signal word Warning

· Hazard-determining components of labeling:
  Cyclopentanone

· Hazard statements
  H226 Flammable liquid and vapor.
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.

· Precautionary statements
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P260 Do not breathe dust/fume/gas/mist/vapors/spray.
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P233 Keep container tightly closed.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P312 Call a POISON CENTER/doctor if you feel unwell.
  P337+P313 If eye irritation persists: Get medical advice/attention.
  P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  P403+P235 Store in a well-ventilated place. Keep cool.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Department issuing SDS: Product safety department
· Contact: Mr. Cole

· Revision History:
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.

· Date of preparation / last revision 05/25/2016 / 1

· Abbreviations and acronyms:
  RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  ICAO: International Civil Aviation Organisation
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  ELINCS: European List of Notified Chemical Substances
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
  PBT: Persistent, Bioaccumulative and Toxic
  vPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Flam. Liq. 3: Flammable liquids, Hazard Category 3
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
1 Identification of the substance/mixture and of the company

· **Product identifier**

· **Trade name:** MCC Primer 80/20

· **Product number:** P021020

· **Application of the substance / the mixture** Layer to promote adhesion

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
  MicroChem Corp.
  200 Flanders Road
  Westborough, MA 01581 USA

· **Information department:**
  Product Safety
  Email: productsafety@microchem.com

· **Emergency telephone number:**
  MicroChem Corp : 617-965-5511
  Chemtrec USA Emergency : 800-424-9300
  Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

· **Classification of the substance or mixture**

  **GHS02 Flame**
  Flam. Liq. 2 H225 Highly flammable liquid and vapor.

  **GHS06 Skull and crossbones**
  Acute Tox. 3 H311 Toxic in contact with skin.

  **GHS08 Health hazard**
  STOT SE 2 H371-H335-H336 May cause damage to the central nervous system. May cause respiratory irritation. May cause drowsiness or dizziness.

  **GHS05 Corrosion**
  Skin Corr. 1B H314 Causes severe skin burns and eye damage.
  Eye Dam. 1 H318 Causes serious eye damage.

  **GHS07**
  Acute Tox. 4 H302 Harmful if swallowed.
  Acute Tox. 4 H332 Harmful if inhaled.
  Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.

(Contd. on page 2)
Label elements

GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

GHS02 GHS05 GHS06 GHS08

Signal word Danger

Hazard-determining components of labeling:
1,1,1,3,3,3-hexamethyldisilazane

Hazard statements

H225 Highly flammable liquid and vapor.
H302+H332 Harmful if swallowed or if inhaled.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H371-H335-H336 May cause damage to the central nervous system. May cause respiratory irritation. May cause drowsiness or dizziness.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P233 Keep container tightly closed.
P273 Avoid release to the environment.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P361 Remove/Take off immediately all contaminated clothing.
P309+P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)

Health = 3
Fire = 3
Reactivity = 1

HMIS-ratings (scale 0 - 4)

Health = 3
Fire = 3
Reactivity = 1
3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Description: Mixture of the substances listed below with nonhazardous additions.

<table>
<thead>
<tr>
<th>Dangerous components:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>108-65-6 1-Methoxy-2-propanol acetate</td>
<td>Flam. Liq. 3, H226</td>
</tr>
<tr>
<td>999-97-3 1,1,1,3,3,3-hexamethyldisilazane</td>
<td>Flam. Liq. 2, H225; Acute Tox. 3, H311; Acute Tox. 3, H331; Skin Corr. 1B, H314; Acute Tox. 4, H302; Eye Irrit. 2A, H319; STOT SE 3, H335</td>
</tr>
</tbody>
</table>

· Additional Components:

<table>
<thead>
<tr>
<th>Additional Components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>70657-70-4 2-Methoxy-1-propyl acetate</td>
</tr>
</tbody>
</table>

4 First-aid measures

· Description of first aid measures
· General information: Immediately remove any clothing soiled by the product.
· After inhalation:
  Supply fresh air.
  Seek immediate medical advice.
· After skin contact:
  Immediately wash with water and soap and rinse thoroughly.
  Seek immediate medical advice.
· After eye contact:
  Rinse opened eye for several minutes under running water.
  Seek immediate medical advice.
· After swallowing:
  Rinse out mouth and then drink plenty of water.
  Do not induce vomiting; immediately call for medical help.
· Information for doctor:
  · Most important symptoms and effects, both acute and delayed: No further relevant information available.
  · Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents:
  Fire-extinguishing powder
  Alcohol resistant foam
  Carbon dioxide
· For safety reasons unsuitable extinguishing agents:
  Water with full jet
  Water
6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Wear protective equipment. Keep unprotected persons away.
  - Ensure adequate ventilation
  - Keep away from ignition sources

- **Environmental precautions:**
  - Do not allow to enter sewers/surface or ground water.
  - Inform respective authorities in case of seepage into water course or sewage system.

- **Methods and material for containment and cleaning up:**
  - Ensure adequate ventilation.
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Clean the affected area carefully; suitable cleaners are:
  - Warm water and cleansing agent
  - Dispose contaminated material as waste according to Section 13.

- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.

7 Handling and storage

- **Handling:**
  - **Precautions for safe handling**
    - Ensure good ventilation/exhaust at the workplace.
    - Prevent formation of aerosols.
    - Keep receptacles tightly sealed.

  - **Information about protection against explosions and fires**
    - Keep ignition sources away - Do not smoke.
    - Protect against electrostatic charges.
    - Use explosion-proof apparatus / fittings and spark-proof tools.

- **Conditions for safe storage, including any incompatibilities**

- **Storage:**
  - **Requirements to be met by storerooms and containers:** Store in a cool location.

  - **Information about storage in one common storage facility:**
    - Do not store together with oxidizing and acidic materials.

  - **Further information about storage conditions:**
    - Keep container tightly sealed.
    - Keep container well-sealed in cool, dry location.
    - Protect from humidity and water.
    - Store under inert gas.

- **Specific end use(s)** No further relevant information available.
Trade name: MCC Primer 80/20

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
  - Components with limit values that require monitoring at the workplace:
    - 108-65-6 1-Methoxy-2-propanol acetate
      - WEEL 50 ppm
  - Additional information: The lists that were valid during the creation were used as basis.
- Exposure controls
- Personal protective equipment:
- General protective and hygienic measures:
  - Keep away from food and beverages.
  - Immediately remove all soiled and contaminated clothing.
  - Wash hands before breaks and at the end of work.
  - Avoid contact with the eyes and skin.
  - Do not inhale gases / fumes / aerosols.
- Respiratory equipment:
  - In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
- Protection of hands:
  - Protective gloves
    - The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  - Material of gloves: Butyl rubber, BR
  - Penetration time of glove material: Contact glove manufacture for break-through time.
  - Eye protection:
    - Tightly sealed goggles

9 Physical and chemical properties

- Information on basic physical and chemical properties
  - General Information
    - Appearance:
      - Form: Fluid
      - Color: Clear
      - Odor: Ammonia-like
      - Odour threshold: Not determined.
    - pH-value: Not determined.
  - Change in condition
    - Melting point/Melting range: Undetermined.
    - Boiling point/Boiling range: 126 °C (259 °F)
    - Flash point: 6 °C (43 °F)
Trade name: MCC Primer 80/20

- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:** 315 °C (599 °F)
- **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not selfigniting.

**Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

- **Explosion limits:**
  - Lower: 0.8 Vol %
  - Upper: 16.3 Vol %

- **Vapor pressure at 20 °C (68 °F):** 12 hPa (9 mm Hg)

- **Density at 20 °C (68 °F):** 0.92824 g/cm³ (7.746 lbs/gal)
  - **Relative density:** Not determined.
  - **Vapour density:** Not determined.
  - **Evaporation rate:** Not determined.

- **Solubility in / Miscibility with Water:** Water miscible No

- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.

- **Solvent content:**
  - **Organic solvents:** 80.0 %
  - **VOC content:** 80.0 %

- **Other information**
  - No further relevant information available.

### 10 Stability and reactivity

- **Reactivity**
- **Chemical stability** Stable under normal use conditions
- **Thermal decomposition / conditions to be avoided:** No decomposition if used and stored according to specifications.
- **Possibility of hazardous reactions**
  - Exothermic reaction with acids.
  - Reacts with strong oxidizing agents.
  - Ammonia is formed upon contact with humid air.

- **Conditions to avoid**
  - Humid air
  - Water

- **Incompatible materials:**
  - Strong Oxidizing Agents, Strong Bases, Strong Acids, Amines
  - Water

- **Hazardous decomposition products:**
  - Hazardous decomposition products formed under fire conditions - Carbon oxides, nitrogen oxides, silicon oxides
11 Toxicological information

- Information on toxicological effects
- Acute toxicity:

  - LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalative LC50/4h</th>
</tr>
</thead>
<tbody>
<tr>
<td>999-97-3 1,1,1,3,3,3-hexamethyldisilazane</td>
<td>850 mg/kg (Rat)</td>
<td>1350 mg/kg (Rat)</td>
<td>10 mg/l (Rat)</td>
</tr>
<tr>
<td>108-65-6 1-Methoxy-2-propanol acetate</td>
<td>8532 mg/kg (Rat)</td>
<td>&gt;5000 mg/kg (Rat)</td>
<td>4345 ppm (Rat)</td>
</tr>
</tbody>
</table>

- Primary irritant effect:
  - on the skin: Strong caustic effect on skin and mucous membranes.
  - on the eye: Strong irritant with the danger of severe eye injury.

- Sensitization: No sensitizing effects known.

- Additional toxicological information:
The product shows the following dangers according to internally approved calculation methods for preparations:
  - Corrosive
  - Toxic
  - Harmful
  - Danger through skin absorption.

- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    None of the ingredients are listed.
  - NTP (National Toxicology Program)
    None of the ingredients are listed.

12 Ecological information

- Toxicity

  - Aquatic toxicity:

<table>
<thead>
<tr>
<th>Substance</th>
<th>EC50/48 h 80 mg/l (daphnia magn)</th>
<th>EC50/72 h 19 mg/l (Desmodesmus subspicatus (green algae))</th>
<th>LC50/96 h 88 mg/l (zebra fish)</th>
</tr>
</thead>
<tbody>
<tr>
<td>999-97-3 1,1,1,3,3,3-hexamethyldisilazane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>108-65-6 1-Methoxy-2-propanol acetate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Persistence and degradability
  No further relevant information available.

- Behavior in environmental systems:

- Bioaccumulative potential
  No further relevant information available.
Trade name: MCC Primer 80/20

(Contd. of page 7)

- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
  - **General notes:**
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **Results of PBT and vPvB assessment**
  - **PBT:** Not applicable.
  - **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

### 13 Disposal considerations

- **Waste treatment methods**
  - **Recommendation:**
    Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
    Disposal must be made in accordance with Federal, State, and Local regulations.
- **Uncleaned packagings:**
  - **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

### 14 Transport information

- **UN-Number**
  - **DOT, ADR, IMDG, IATA** UN2924
- **UN proper shipping name**
  - **DOT, ADR** Flammable liquid, corrosive, n.o.s. (1,1,1,3,3,3-hexamethyldisilazane, 1-Methoxy-2-propanol acetate)
  - **IMDG, IATA** FLAMMABLE LIQUID, CORROSIVE, N.O.S. (1,1,1,3,3,3-hexamethyldisilazane, 1-Methoxy-2-propanol acetate)
- **Transport hazard class(es)**
  - **DOT**
    - **Class** 3 Flammable liquids.
    - **Label** 3
  - **ADR, IMDG, IATA**
    - **Class** 3 Flammable liquids
    - **Label** 3
  - **Packing group**
    - **DOT, ADR, IMDG, IATA** II
### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **Sara**
    - **Section 355 (extremely hazardous substances):**
      None of the ingredients are listed.
    - **Section 313 (Specific toxic chemical listings):**
      None of the ingredients is listed.
  - **TSCA (Toxic Substances Control Act):**
    All ingredients are listed or comply with TSCA regulations.
  - **Proposition 65**
    - **Chemicals known to cause cancer:**
      None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for females:**
      None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for males:**
      None of the ingredients are listed.
    - **Chemicals known to cause developmental toxicity:**
      None of the ingredients are listed.
  - **Carcinogenic categories**
    - **EPA (Environmental Protection Agency)**
      None of the ingredients are listed.
    - **TLV (Threshold Limit Value established by ACGIH)**
      None of the ingredients are listed.
    - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
      None of the ingredients are listed.
    - **OSHA-Ca (Occupational Safety & Health Administration)**
      None of the ingredients are listed.
    - **New Jersey State Right To Know List**
      999-97-3 1,1,1,3,3,3-hexamethyldisilazane
    - **Pennsylvania Hazardous Substances List**
      999-97-3 1,1,1,3,3,3-hexamethyldisilazane

(Contd. on page 10)
· California SCAQMD Rule 443.1 VOC's: 960 g/l; vapor pressure 3.8 mm Hg @ 25C
· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
· Hazard pictograms

GHS02  GHS05  GHS06  GHS08

· Signal word Danger
· Hazard-determining components of labeling:
  1,1,1,3,3,3-hexamethyldisilazane
· Hazard statements
  H225 Highly flammable liquid and vapor.
  H302+H332 Harmful if swallowed or if inhaled.
  H311 Toxic in contact with skin.
  H314 Causes severe skin burns and eye damage.
  H371-H335-H36 May cause damage to the central nervous system. May cause respiratory irritation. May cause drowsiness or dizziness.
  H412 Harmful to aquatic life with long lasting effects.
· Precautionary statements
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P260 Do not breathe dust/fume/gas/mist/vapours/spray.
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P233 Keep container tightly closed.
  P273 Avoid release to the environment.
  P303+P351+P338 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
  P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P361 Remove/Take off immediately all contaminated clothing.
  P309+P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
  P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
  P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  P403+P235 Store in a well-ventilated place. Keep cool.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Department issuing MSDS: Product safety department
· Contact: Mr. Cole
· Revision History:
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.
· Date of preparation / last revision 12/23/2015 / -
### Abbreviations and acronyms:

- **RID**: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- **ICAO**: International Civil Aviation Organization
- **ADR**: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- **IMDG**: International Maritime Code for Dangerous Goods
- **DOT**: US Department of Transportation
- **IATA**: International Air Transport Association
- **ACGIH**: American Conference of Governmental Industrial Hygienists
- **EINECS**: European Inventory of Existing Commercial Chemical Substances
- **ELINCS**: European List of Notified Chemical Substances
- **CAS**: Chemical Abstracts Service (division of the American Chemical Society)
- **NFPA**: National Fire Protection Association (USA)
- **HMIS**: Hazardous Materials Identification System (USA)
- **VOC**: Volatile Organic Compounds (USA, EU)
- **LC50**: Lethal concentration, 50 percent
- **LD50**: Lethal dose, 50 percent
SAFETY DATA SHEET

1. Identification

Product identifier: Methanol

Other means of identification
Synonyms: Methyl Alcohol

Product No.: 3042, 9124, 3292, 3290, 6290, 8820, 9424, 9423, 9098, 9097, 9077, 9076, 9073, 9070, 9069, 9067, 9066, 9063, 9049, 8888, 8818, 8814, 9093, 9065, V184, 3041, 3017, 3004, H603, H488, H080, 5842, 3016, 9863, 9830, 5595, 5370, 9263, 72690, 12210

Recommended use and restriction on use
Recommended use: Not available.
Restrictions on use: Not known.

Details of the supplier of the safety data sheet

Manufacturer
Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
          Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax: Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

Emergency telephone number:
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard Classification

Physical Hazards
Flammable liquids Category 2

Health Hazards
Acute toxicity (Oral) Category 3
Acute toxicity (Dermal) Category 3
Acute toxicity (Inhalation - vapor) Category 3
Skin Corrosion/Irritation Category 2
Serious Eye Damage/Eye Irritation Category 2A
Toxic to reproduction Category 2
Specific Target Organ Toxicity - Single Exposure Category 1

Label Elements

Hazard Symbol:
Signal Word: Danger


Precautionary Statement

Prevention: Obtain special instructions before use. Do not breathe dust/fume/gas/mist/vapors/spray. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Take precautionary measures against static discharge.

Response: IF exposed or concerned: Get medical advice/attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continuously rinse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

Storage: Store in a well-ventilated place. Keep cool. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.

3. Composition/information on ingredients

Substances

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td></td>
<td>67-56-1</td>
<td>99 - 100%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.
Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention.

Most important symptoms/effects, acute and delayed

Symptoms: Toxic if inhaled. Toxic if swallowed. Toxic in contact with skin. Irritating to eyes, respiratory system and skin.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: Use water spray to keep fire-exposed containers cool. Fight fire from a protected location. Move containers from fire area if you can do so without risk. Cool containers exposed to flames with water until well after the fire is out.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: Can be ignited easily and burns vigorously. Vapor from the solvent may accumulate in container headspace resulting in flammability hazard. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Static charges generated by emptying package in or near flammable vapor may cause flash fire.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.

6. Accidental release measures
**Personal precautions, protective equipment and emergency procedures:**
Use personal protective equipment. Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.

**Methods and material for containment and cleaning up:**
Eliminate all ignition sources if safe to do so. Use only non-sparking tools. All equipment used when handling the product must be grounded. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

**Notification Procedures:**
Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

**Environmental Precautions:**
Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

**Precautions for safe handling:**
DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharge. Use only non-sparking tools. Use personal protective equipment as required. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Do not eat, drink or smoke when using the product. Use only with adequate ventilation. Wash hands thoroughly after handling. See Section 8 of the SDS for Personal Protective Equipment.

**Conditions for safe storage, including any incompatibilities:**
Keep away from food, drink and animal feeding stuffs. Keep out of reach of children. Keep container tightly closed in a cool, well-ventilated place. Store in a dry place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

### 8. Exposure controls/personal protection

#### Control Parameters

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>TWA</td>
<td>200 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>250 ppm</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>325 mg/m3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>REL</td>
<td>260 mg/m3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>260 mg/m3</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>260 mg/m3</td>
<td>US. OSHA Table Z-T-A (29 CFR 1910.1000) (1989)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>325 mg/m3</td>
<td>US. OSHA Table Z-T-A (29 CFR 1910.1000) (1989)</td>
</tr>
</tbody>
</table>

#### Biological Limit Values

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>15 mg/l (Urine)</td>
<td>ACGIH BEL (03 2013)</td>
</tr>
</tbody>
</table>
Appropriate Engineering Controls
No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

Eye/face protection: Chemical goggles and face shield are recommended.

Skin Protection
Hand Protection: Chemical resistant gloves
Other: Wear suitable protective clothing and gloves.

Respiratory Protection: In case of inadequate ventilation use suitable respirator.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned. Wash contaminated clothing before reuse.

9. Physical and chemical properties

Appearance

Physical state: liquid
Form: liquid
Color: Colorless
Odor: Characteristic, Pungent
Odor threshold: No data available.
pH: No data available.
Melting point/freezing point: -97.8 °C
Initial boiling point and boiling range: 64 °C (101.3 kPa)
Flash Point: 11 - 12 °C (Closed Cup)
Evaporation rate: No data available.
Flammability (solid, gas): Class IB Flammable Liquid

Upper/lower limit on flammability or explosive limits

Flammability limit - upper (%): 36 % (V)
Flammability limit - lower (%): 6 % (V)
Explosive limit - upper (%): No data available.
Explosive limit - lower (%): No data available.
Vapor pressure: 16.9 kPa (25 °C)
Vapor density: 1.11 Air=1
Relative density: 0.8 (20 °C)
Solubility(ies)

Solubility in water: 1,000 g/l Miscible with water.
Solubility (other): No data available.
Partition coefficient (n-octanol/water): -0.77
Auto-ignition temperature: 464 °C
Decomposition temperature: No data available.
Viscosity: No data available.

Other information
Molecular weight: 32.04 g/mol (CH4O)

10. Stability and reactivity

Reactivity: Contact with metals may evolve flammable hydrogen gas.

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur.

Conditions to Avoid: Heat, sparks, flames. Sunlight.


Hazardous Decomposition Products: Thermal decomposition may release oxides of carbon. Formaldehyde. Toxic gas

11. Toxicological information

Information on likely routes of exposure
Ingestion: Toxic if swallowed.

Inhalation: Toxic by inhalation.

Skin Contact: Toxic in contact with skin.

Eye contact: Causes serious eye irritation.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: LD 50 (Rat): 5,628 mg/kg
LD 50 (Mouse): 7,300 mg/kg
LD 50 (Rabbit): 14,300 mg/kg

Dermal Product: LD 50 (Rabbit): 15,800 mg/kg

Inhalation Product: LC 50 (Rat, 1 h): > 145000 ppm
LC 50 (Rat, 4 h): 64000 ppm

Repeated dose toxicity Product: In serious cases absorption of methanol in the body may lead to damage to the eyesight.

Skin Corrosion/Irritation Product: Causes skin irritation.

Serious Eye Damage/Eye Irritation Product: Causes eye irritation.

Respiratory or Skin Sensitization Product: Not a skin sensitizer.
Carcinogenicity

**Product:**

This substance has no evidence of carcinogenic properties.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**
No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**
No carcinogenic components identified

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**
No carcinogenic components identified

Germ Cell Mutagenicity

**In vitro**

**Product:**

No mutagenic components identified

**In vivo**

**Product:**

No mutagenic components identified

Reproductive toxicity

**Product:**

Suspected of damaging fertility or the unborn child.

**Specific Target Organ Toxicity - Single Exposure**

**Product:**

Central nervous system. Eyes.

**Specific Target Organ Toxicity - Repeated Exposure**

**Product:**

None known.

**Aspiration Hazard**

**Product:**

No data available.

**Other effects:**

None known.

12. **Ecological information**

**Ecotoxicity:**

**Acute hazards to the aquatic environment:**

**Fish**

**Product:**

LC 50 (Fathead minnow (Pimephales promelas), 96 h): > 100 mg/l

**Aquatic Invertebrates**

**Product:**

EC 50 (Water flea (Daphnia magna), 48 h): > 10,000 mg/l

**Chronic hazards to the aquatic environment:**

**Fish**

**Product:**

No data available.

**Aquatic Invertebrates**

**Product:**

No data available.

**Toxicity to Aquatic Plants**

**Product:**

No data available.

**Persistence and Degradability**

**Biodegradation**

**Product:**

Expected to be readily biodegradable.
**BOD/COD Ratio**  
**Product:** No data available.

**Bioaccumulative Potential**  
**Bioconcentration Factor (BCF)**  
**Product:** May accumulate in soil and water systems.

**Partition Coefficient n-octanol / water (log Kow)**  
**Product:** Log Kow: -0.77

**Mobility in Soil:**  
No data available.

**Other Adverse Effects:**  
The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

### 13. Disposal considerations

**Disposal instructions:**  
Discharge, treatment, or disposal may be subject to national, state, or local laws.

**Contaminated Packaging:**  
Since emptied containers retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

**DOT**
- **UN Number:** UN 1230
- **UN Proper Shipping Name:** Methanol
- **Transport Hazard Class(es):** 3
- **Label(s):** 3
- **Packing Group:** II
- **Marine Pollutant:** Not a Marine Pollutant
- **Special precautions for user:** –

**IMDG**
- **UN Number:** UN 1230
- **UN Proper Shipping Name:** METHANOL
- **Transport Hazard Class(es):** 3, 6.1
- **Label(s):** 3, 6.1
- **EmS No.:** F-E, S-D
- **Packing Group:** II
- **Marine Pollutant:** Not a Marine Pollutant
- **Special precautions for user:** –

**IATA**
- **UN Number:** UN 1230
- **Proper Shipping Name:** Methanol
- **Transport Hazard Class(es):** 3, 6.1
- **Label(s):** 3, 6.1
- **Marine Pollutant:** Not a Marine Pollutant
- **Packing Group:** II
- **Special precautions for user:** –

### 15. Regulatory information

**US Federal Regulations**
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>5000 lbs.</td>
</tr>
</tbody>
</table>

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute (Immediate)
Chronic (Delayed)
Fire

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>5000 lbs.</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>10000 lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for other users</th>
<th>Reporting threshold for manufacturing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHYL ALCOHOL</td>
<td>10000 lbs</td>
<td>25000 lbs</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130): None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
METHYL ALCOHOL Developmental toxin. WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity METHYL ALCOHOL

US. Massachusetts RTK - Substance List

Chemical Identity METHYL ALCOHOL

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity METHYL ALCOHOL

US. Rhode Island RTK

Chemical Identity METHYL ALCOHOL
Inventory Status:
- Australia AICS: On or in compliance with the inventory
- Canada DSL Inventory List: On or in compliance with the inventory
- EINECS, ELINCS or NLP: On or in compliance with the inventory
- Japan (ENCS) List: On or in compliance with the inventory
- China Inv. Existing Chemical Substances: Not in compliance with the inventory
- Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
- Canada NDSL Inventory: Not in compliance with the inventory
- Philippines PICCS: On or in compliance with the inventory
- US TSCA Inventory: On or in compliance with the inventory
- New Zealand Inventory of Chemicals: On or in compliance with the inventory
- Japan ISHL Listing: On or in compliance with the inventory
- Japan Pharmacopoeia Listing: Not in compliance with the inventory

16. Other information, including date of preparation or last revision

NFPA Hazard ID

Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 04-02-2015
Revision Date: No data available.
Version #: 1.3
Further Information: No data available.
Disclaimer:

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1 Identification of the substance/mixture and of the company

· **Product identifier**

· **Trade name:** MMA(8.5):MAA Copolymer Series Resists

· **Product number:**
  M310002, M310004, M310006, M310007, M310008, M310009, M310010, M310011, M310012, M310512, M310013, M310014, M310015

· **Application of the substance / the mixture** Photoresist

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
  MicroChem Corp.
  200 Flanders Road
  Westborough, MA 01581 USA

· **Information department:**
  Product Safety
  Email: productsafety@microchem.com

· **Emergency telephone number:**
  MicroChem Corp: 617-965-5511
  Chemtrec USA Emergency: 800-424-9300
  Chemtrec International Emergency: 703-527-3887

2 Hazard(s) identification

· **Classification of the substance or mixture**

  ![GHS02 Flame](image)
  Flam. Liq. 3 H226 Flammable liquid and vapor.

  ![GHS05 Corrosion](image)
  Eye Dam. 1 H318 Causes serious eye damage.

  ![GHS07](image)
  STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

· **Label elements**

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**

  ![GHS02](image) ![GHS05](image) ![GHS07](image)

· **Signal word** Danger

· **Hazard-determining components of labeling:**
  Ethyl lactate

· **Hazard statements**
  H226 Flammable liquid and vapor.

(Contd. on page 2)
Trade name: MMA(8.5)MAA Copolymer Series Resists

H318 Causes serious eye damage.
H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

- Precautionary statements
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  - P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  - P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  - P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  - P403+P235 Store in a well-ventilated place. Keep cool.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- Classification system:
  - NFPA ratings (scale 0 - 4)
    - Health = 2
    - Fire = 2
    - Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    - HEALTH 2
    - FIRE 2
    - REACTIVITY 0

- Other hazards
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Mixtures
- Description: Mixture of the substances listed below with nonhazardous additions.

<table>
<thead>
<tr>
<th>Dangerous components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>97-64-3 Ethyl lactate</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>25086-15-1 Poly(methyl methacrylate-co-methacrylic acid)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

4 First-aid measures

- Description of first aid measures
- After inhalation:
  Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
After skin contact:
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.

After eye contact:
Rinse opened eye for several minutes under running water and then consult a doctor.

After swallowing:
Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.

Information for doctor:
· Most important symptoms and effects, both acute and delayed No further relevant information available.
· Indication of any immediate medical attention and special treatment needed
  No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
  · Suitable extinguishing agents:
    Alcohol resistant foam
    Fire-extinguishing powder
    Carbon dioxide

· For safety reasons unsuitable extinguishing agents:
  Water with full jet
  Water

· Special hazards arising from the substance or mixture
  Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.

· Advice for firefighters
  · Protective equipment: Wear SCBA.

6 Accidental release measures

· Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation
  Keep away from ignition sources

· Environmental precautions: Do not allow to enter sewers/ surface or ground water.

· Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents

· Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

· Handling:
  · Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Prevent formation of aerosols.
    Keep receptacles tightly sealed.
Trade name: MMA(8.5)MAA Copolymer Series Resist

- **Information about protection against explosions and fires:**
  - Keep ignition sources away - Do not smoke.
  - Use explosion-proof apparatus / fittings and spark-proof tools.
  - Protect against electrostatic charges.

- **Conditions for safe storage, including any incompatibilities**
  - **Storage:**
    - **Requirements to be met by storerooms and containers:** Store in a cool location.
    - **Information about storage in one common storage facility:**
      - Do not store together with alkalis (caustic solutions).
      - Do not store together with oxidizing and acidic materials.
  - **Further information about storage conditions:** Keep container well-sealed in cool, dry location.
  - **Specific end use(s) No further relevant information available.**

---

### 8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**
- **Components with limit values that require monitoring at the workplace:**
  - The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
  - **General protective and hygienic measures:**
    - Keep away from food and beverages.
    - Immediately remove all soiled and contaminated clothing.
    - Wash hands before breaks and at the end of work.
    - Avoid contact with the eyes.
  - **Respiratory equipment:**
    - In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
  - **Protection of hands:**
    - **Protective gloves**
      - The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
      - **Material of gloves**
        - Rubber gloves
        - Nitrile rubber, NBR
      - **Penetration time of glove material** Contact glove manufacture for break-through time.
    - **Eye protection:**
      - Tightly sealed goggles
### 9 Physical and chemical properties

- **Information on basic physical and chemical properties**

- **General Information**
  - **Appearance:**
    - Form: Liquid
    - Color: Colorless
  - **Odor:** Sweet
  - **Odour threshold:** Not determined.
  - **pH-value:** Not determined.

- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 154 °C (309 °F)

- **Flash point:** 46 °C (115 °F)

- **Flammability (solid, gaseous):** Not applicable.

- **Ignition temperature:** 400 °C (752 °F)

- **Decomposition temperature:** Not determined.

- **Auto igniting:** Product is not selfigniting.

- **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

- **Explosion limits:**
  - Lower: 1.0 Vol %
  - Upper: 17.0 Vol %

- **Vapor pressure at 20 °C (68 °F):** 3 hPa (2 mm Hg)

- **Density:** Not determined.

- **Relative density**
  - See Table 1 Other Information

- **Vapour density**
  - Not determined.

- **Evaporation rate**
  - Not determined.

- **Solubility in / Miscibility with Water:** Partly miscible.

- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity:**
  - Dynamic: Not determined.
  - Kinematic: Not determined.
Trade name: MMA(8.5)MAA Copolymer Series Resists

- Solvent content: See Table 1 below
- VOC content: See Table 1 below
- Other information: Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Sp. Grav.</th>
<th>Vol.(%by wt.)</th>
<th>VOC (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMA(8.5)MAA EL 2</td>
<td>M310002</td>
<td>1.034</td>
<td>99</td>
<td>1025</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 4</td>
<td>M310004</td>
<td>1.036</td>
<td>98</td>
<td>1015</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 6</td>
<td>M310006</td>
<td>1.037</td>
<td>97</td>
<td>1005</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 7</td>
<td>M310007</td>
<td>1.039</td>
<td>96</td>
<td>1000</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 8</td>
<td>M310008</td>
<td>1.041</td>
<td>95</td>
<td>995</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 9</td>
<td>M310009</td>
<td>1.042</td>
<td>94</td>
<td>980</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 10</td>
<td>M310010</td>
<td>1.043</td>
<td>93</td>
<td>970</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 11</td>
<td>M310011</td>
<td>1.045</td>
<td>92</td>
<td>960</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 12</td>
<td>M310012</td>
<td>1.046</td>
<td>91</td>
<td>950</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 12.5</td>
<td>M310512</td>
<td>1.046</td>
<td>90</td>
<td>940</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 13</td>
<td>M310013</td>
<td>1.047</td>
<td>89</td>
<td>930</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 14</td>
<td>M310014</td>
<td>1.049</td>
<td>88</td>
<td>925</td>
</tr>
<tr>
<td>MMA(8.5)MAA EL 15</td>
<td>M310015</td>
<td>1.052</td>
<td>70</td>
<td>735</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

- Reactivity
- Chemical stability: Stable under normal use conditions
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- Possibility of hazardous reactions: No dangerous reactions known.
- Conditions to avoid: Heat, flames and sparks. Extremes of temperature and direct sunlight.
- Incompatible materials: Strong Oxidizing Agents, Strong Acids, Strong Bases
- Hazardous decomposition products: Carbon monoxide and carbon dioxide

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:

<table>
<thead>
<tr>
<th>LD/LC50 values that are relevant for classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>97-64-3 Ethyl lactate</td>
</tr>
<tr>
<td>Oral LD50</td>
</tr>
<tr>
<td>Dermal LD50</td>
</tr>
<tr>
<td>Inhalative LC50 8 hr</td>
</tr>
</tbody>
</table>

- Primary irritant effect:
  - on the skin: Irritant to skin and mucous membranes.
  - on the eye: Strong irritant with the danger of severe eye injury.
  - Sensitization: No sensitizing effects known.
  - Experience with humans: No further relevant information available.
  - Additional toxicological information:
    The product shows the following dangers according to internally approved calculation methods for preparations:
    Irritant
### 12 Ecological information

#### Toxicity

- **Aquatic toxicity:**
  - 97-64-3 Ethyl lactate
  - EC50/48 h: 560 mg/l (daphnia magna)

- **Persistence and degradability:** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.
- **Additional ecological information:**

#### General notes:
- Water hazard class 1 (Self-assessment): slightly hazardous for water
- Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

#### Results of PBT and vPvB assessment
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects:** No further relevant information available.

### 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
  - Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
  - Disposal must be made in accordance with Federal, State, and Local regulations.
- **Uncleaned packagings**
- **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

### 14 Transport information

- **UN-Number**
  - DOT, ADR, IMDG, IATA: UN1866
- **UN proper shipping name**
  - DOT, IMDG, IATA: RESIN SOLUTION
  - ADR: 1866 RESIN SOLUTION
### Transport hazard class(es)

- **DOT**
  - Class: 3
  - Label: Flammable liquids

- **ADR, IMDG, IATA**
  - Class: 3
  - Label: Flammable liquids

### Packing group

- **DOT, ADR, IMDG, IATA**: III

### Environmental hazards:

- **Marine pollutant**: No

### Special precautions for user

- **Warning**: Flammable liquids
- **Danger code (Kemler)**: 30
- **EMS Number**: F-E,S-E

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- Not applicable.

### UN "Model Regulation"

- UN1866, RESIN SOLUTION, 3, III

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**

  - **Sara**
    - **Section 355 (extremely hazardous substances)**: None of the ingredients are listed.
    - **Section 313 (Specific toxic chemical listings)**: None of the ingredients is listed.

  - **TSCA (Toxic Substances Control Act)**: All ingredients are listed or comply with TSCA regulations.

  - **Proposition 65**
    - **Chemicals known to cause cancer**: None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for females**: None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for males**: None of the ingredients are listed.
Trade name: MMA(8.5)MAA Copolymer Series Resists

* Chemicals known to cause developmental toxicity:
  None of the ingredients are listed.

* Carcinogenic categories
  
  **EPA (Environmental Protection Agency)**
  None of the ingredients are listed.

  **TLV (Threshold Limit Value established by ACGIH)**
  None of the ingredients are listed.

  **NIOSH-Ca (National Institute for Occupational Safety and Health)**
  None of the ingredients are listed.

  **OSHA-Ca (Occupational Safety & Health Administration)**
  None of the ingredients are listed.

  **Massachusetts State Right To Know List**
  97-64-3 Ethyl lactate

  **New Jersey State Right To Know List**
  97-64-3 Ethyl lactate

  **Pennsylvania Hazardous Substances List**
  97-64-3 Ethyl lactate

* California SCAQMD Rule 443.1 VOC's: See Table 1 - Section 9

* GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

* Hazard pictograms

  ![GHS02](image)
  ![GHS05](image)
  ![GHS07](image)

* Signal word Danger

* Hazard-determining components of labeling:
  Ethyl lactate

* Hazard statements
  
  **H226** Flammable liquid and vapor.
  **H318** Causes serious eye damage.
  **H335-H336** May cause respiratory irritation. May cause drowsiness or dizziness.

* Precautionary statements

  **P210** Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  **P261** Avoid breathing dust/fume/gas/mist/vapours/spray.
  **P280** Wear protective gloves/protective clothing/eye protection/face protection.
  **P233** Keep container tightly closed.
  **P305+P351+P338** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  **P312** Call a POISON CENTER or doctor/physician if you feel unwell.
  **P370+P378** In case of fire: Use for extinction: Alcohol resistant foam.
  **P370+P378** In case of fire: Use for extinction: Fire-extinguishing powder.
  **P370+P378** In case of fire: Use for extinction: Carbon dioxide.
  **P403+P235** Store in a well-ventilated place. Keep cool.
  **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.
Trade name: MMA(8.5)MAA Copolymer Series Resists

- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing MSDS:** Product safety department
- **Contact:** Mr. Cole

**Revision History:**

10/03/2014. Product numbers updated, Table 1 specific gravity and VOC data corrected, Contact updated.

**Date of preparation / last revision** 12/24/2015 / 1

**Abbreviations and acronyms:**

- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- ICAO: International Civil Aviation Organization
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- ACGIH: American Conference of Governmental Industrial Hygienists
- EINECS: European Inventory of Existing Commercial Chemical Substances
- ELINCS: European List of Notified Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- NFPA: National Fire Protection Association (USA)
- HMIS: Hazardous Materials Identification System (USA)
- VOC: Volatile Organic Compounds (USA, EU)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
SAFETY DATA SHEET

1. Identification

Product identifier: NITRIC ACID

Other means of identification

Synonyms: Aqua Fortis, Azotic Acid

Product No.: 9604, V471, V231, V230, V077, 6623, 2712, 2707, 2706, 2704, H988, 5876, 5856, 5801, 5796, 1409, 9761, 9670, 9618, 9617, 9616, 9615, 9612, 9607, 9606, 9601, 9598, 9597, 5371, 20758, 20754, 20752, 20750

Recommended use and restriction on use

Recommended use: Not available.
Restrictions on use: Not known.

Details of the supplier of the safety data sheet

Manufacturer

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034

Telephone: Customer Service: 855-282-6867
Fax: 610-573-2610
Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

Emergency telephone number:
CHEMTREC: 1-800-424-9300 within US and Canada
CHEMTREC: 1-703-527-3887 outside US and Canada

2. Hazard(s) identification

Hazard Classification

Physical Hazards
Oxidizing liquids Category 3
Corrosive to metals Category 1

Health Hazards
Skin Corrosion/Irritation Category 1A
Serious Eye Damage/Eye Irritation Category 1
Specific Target Organ Toxicity - Single Exposure Category 3

Unknown toxicity - Health

<table>
<thead>
<tr>
<th>Health Effect</th>
<th>Acute Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity, oral</td>
<td>65 %</td>
</tr>
<tr>
<td>Acute toxicity, dermal</td>
<td>65 %</td>
</tr>
<tr>
<td>Acute toxicity, inhalation, vapor</td>
<td>100 %</td>
</tr>
<tr>
<td>Acute toxicity, inhalation, dust or mist</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Unknown toxicity - Environment
Acute hazards to the aquatic environment 65 %
Chronic hazards to the aquatic environment 65 %

Label Elements

Hazard Symbol:

Signal Word: Danger
Hazard Statement: May intensify fire; oxidizer.
May be corrosive to metals.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

Precautionary Statement

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Keep only in original container. Keep away from heat. Keep/Store away from clothing/combustible materials. Take any precaution to avoid mixing with combustibles. Use only outdoors or in a well-ventilated area.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. Immediately call a POISON CENTER/doctor. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Absorb spillage to prevent material damage.

Storage: Store locked up. Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td></td>
<td>7697-37-2</td>
<td>65 - 70%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures
General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Causes severe skin burns and eye damage. Causes digestive tract burns. Spray mists may cause respiratory tract irritation.

Hazards: Corrosive.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: Strong oxidizer - contact with other material may cause fire.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, fog, CO2, dry chemical, or regular foam.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Oxidizing Contact with combustible material may cause fire. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures
**Personal precautions, protective equipment and emergency procedures:**
Keep unauthorized personnel away. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

**Methods and material for containment and cleaning up:**
Keep combustibles (wood, paper, oil, etc.) away from spilled material. Stop leak if possible without any risk. Do not absorb in sawdust or other combustible materials. Absorb spill with vermiculite or other inert material. Collect in a non-combustible container for prompt disposal. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

**Notification Procedures:**
Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

**Environmental Precautions:**
Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

**Precautions for safe handling:**
Keep away from combustible material. Do not get in eyes, on skin, on clothing. Wash hands thoroughly after handling. Do not eat, drink or smoke when using the product. Do not taste or swallow. Never add water to acid! Never pour water into acid/base. Dilute by slowly pouring the product into water while stirring.

**Conditions for safe storage, including any incompatibilities:**
Do not store in metal containers. Store away from heat and light. Keep away from combustible material. Keep containers closed when not in use. Store in a cool, dry place. Keep container in a well-ventilated place.

### 8. Exposure controls/personal protection

**Control Parameters**

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupational Exposure Limits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NITRIC ACID</td>
<td>STEL</td>
<td>4 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 ppm</td>
</tr>
<tr>
<td>STEL</td>
<td>4 ppm</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td>REL</td>
<td>2 ppm</td>
<td>5 mg/m3</td>
</tr>
<tr>
<td>PEL</td>
<td>2 ppm</td>
<td>5 mg/m3</td>
</tr>
<tr>
<td>STEL</td>
<td>4 ppm</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td>TWA</td>
<td>2 ppm</td>
<td>5 mg/m3</td>
</tr>
</tbody>
</table>

**Appropriate Engineering Controls:**
Adequate ventilation should be provided so that exposure limits are not exceeded.
Individual protection measures, such as personal protective equipment

**General information:**
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

**Eye/face protection:**
Wear safety glasses with side shields (or goggles) and a face shield.

**Skin Protection**
- **Hand Protection:** Chemical resistant gloves
- **Other:** Wear suitable protective clothing.

**Respiratory Protection:**
In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.

**Hygiene measures:**
Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

### 9. Physical and chemical properties

**Appearance**
- **Physical state:** Liquid
- **Form:** Liquid
- **Color:** Colorless to slightly yellow
- **Odor:** Pungent
- **pH:** 1 (6.30 g/l, )
- **Melting point/freezing point:** -42 °C
- **Initial boiling point and boiling range:** 122 °C
- **Flash Point:** Not applicable
- **Evaporation rate:** No data available.
- **Flammability (solid, gas):** No data available.

**Upper/lower limit on flammability or explosive limits**
- **Flammability limit - upper (%):** No data available.
- **Flammability limit - lower (%):** No data available.
- **Explosive limit - upper (%):** No data available.
- **Explosive limit - lower (%):** No data available.
- **Vapor pressure:** 6.4 kPa
- **Vapor density:** 2.5
- **Relative density:** 1.41 (20 °C)
- **Solubility (in water):** Soluble
- **Solubility (other):** No data available.
- **Partition coefficient (n-octanol/water):** No data available.
- **Auto-ignition temperature:** No data available.
- **Decomposition temperature:** No data available.
- **Viscosity:** No data available.
10. Stability and reactivity

Reactivity: Reacts violently with strong alkaline substances.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: Hazardous polymerization does not occur. Decomposes on heating.

Conditions to avoid: Reacts violently with strong alkaline substances. Avoid contact with strong reducing agents. Excessive heat. Contact with incompatible materials.


Hazardous Decomposition Products: Nitrogen Oxides By heating and fire, corrosive vapors/gases may be formed.

11. Toxicological information

Information on likely routes of exposure

Ingestion: May cause burns of the gastrointestinal tract if swallowed.

Inhalation: May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Skin Contact: Causes severe skin burns.

Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: No data available.

Dermal Product: No data available.

Inhalation Product: No data available.

Specified substance(s): NITRIC ACID
- LC 50 (Rat, 1 h): 7 mg/l
- LC 50 (Rat, 4 h): 65 ppm
- LC 50 (Mouse, 4 h): 67 ppm

Repeated dose toxicity Product: No data available.

Skin Corrosion/Irritation Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation Product: Causes serious eye damage.

Respiratory or Skin Sensitization Product: Not a skin nor a respiratory sensitizer.
Carcinogenicity

**Product:**
This substance has no evidence of carcinogenic properties.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**
No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**
No carcinogenic components identified

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**
No carcinogenic components identified

**Germ Cell Mutagenicity**

**In vitro**

**Product:**
No mutagenic components identified

**In vivo**

**Product:**
No mutagenic components identified

**Reproductive toxicity**

**Product:**
No components toxic to reproduction

**Specific Target Organ Toxicity - Single Exposure**

**Product:**
Respiratory tract irritation.

**Specific Target Organ Toxicity - Repeated Exposure**

**Product:**
None known.

**Aspiration Hazard**

**Product:**
Not classified

**Other effects:**
None known.

### 12. Ecological information

**Ecotoxicity:**

**Acute hazards to the aquatic environment:**

**Fish**

**Product:**
No data available.

**Specified substance(s):**
NITRIC ACID

LC 50 (Starfish (Asterias rubens), 48 h): 100 - 330 mg/l Mortality

**Aquatic Invertebrates**

**Product:**
No data available.

**Specified substance(s):**
NITRIC ACID

LC 50 (Cockle (Cerastoderma edule), 48 h): 330 - 1,000 mg/l Mortality

LC 50 (Green or European shore crab (Carcinus maenas), 48 h): 180 mg/l Mortality

**Chronic hazards to the aquatic environment:**

**Fish**

**Product:**
No data available.

**Aquatic Invertebrates**

**Product:**
No data available.
Toxicity to Aquatic Plants

Product: No data available.

Persistence and Degradability

Biodegradation

Product: Expected to be readily biodegradable.

BOD/COD Ratio

Product: No data available.

Bioaccumulative Potential

Bioconcentration Factor (BCF)

Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)

Product: No data available.

Mobility in Soil:
The product is water soluble and may spread in water systems.

Other Adverse Effects:
The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging:
Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number: UN 2031
UN Proper Shipping Name: Nitric acid
Transport Hazard Class(es):
Class(es): 8, 5.1
Label(s): 8, 5.1
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –

IMDG

UN Number: UN 2031
UN Proper Shipping Name: NITRIC ACID
Transport Hazard Class(es):
Class(es): 8, 5.1
Label(s): 8, 5.1
EmS No.: F-A, S-Q
Packing Group: II
Marine Pollutant: Not a Marine Pollutant
Special precautions for user: –
IATA

UN Number: UN 2031
Proper Shipping Name: Nitric acid
Transport Hazard Class(es):
  Class(es): 8, 5.1
  Label(s): 8, 5.1
Marine Pollutant: Not a Marine Pollutant
Packing Group: II
Special precautions for user: –

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>1000 lbs.</td>
</tr>
</tbody>
</table>

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute (Immediate)
Chronic (Delayed)
Fire

SARA 302 Extremely Hazardous Substance

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>1000 lbs.</td>
<td>1000 lbs.</td>
</tr>
</tbody>
</table>

SARA 304 Emergency Release Notification

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>1000 lbs.</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>500 lbs.</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for other users</th>
<th>Reporting threshold for manufacturing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>10000 lbs.</td>
<td>25000 lbs.</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>Reportable quantity: 1000 lbs.</td>
</tr>
</tbody>
</table>

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reportable quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITRIC ACID</td>
<td>15000 lbs</td>
</tr>
</tbody>
</table>

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.
US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
NITRIC ACID

US. Massachusetts RTK - Substance List

Chemical Identity
NITRIC ACID

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
NITRIC ACID

US. Rhode Island RTK

Chemical Identity
NITRIC ACID

Inventory Status:
- Australia AICS: On or in compliance with the inventory
- Canada DSL Inventory List: On or in compliance with the inventory
- EINECS, ELINCS or NLP: On or in compliance with the inventory
- Japan (ENCS) List: On or in compliance with the inventory
- China Inv. Existing Chemical Substances: Not in compliance with the inventory.
- Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
- Canada NDSL Inventory: Not in compliance with the inventory.
- Philippines PICCS: On or in compliance with the inventory
- US TSCA Inventory: On or in compliance with the inventory
- New Zealand Inventory of Chemicals: On or in compliance with the inventory
- Japan ISHL Listing: Not in compliance with the inventory.
- Japan Pharmacopoeia Listing: Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible
OXY: Oxidizer

Issue Date: 03-15-2016
Revision Date: No data available.
Version #: 3.0
Further Information: No data available.
Disclaimer:

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1 Identification of the substance/mixture and of the company

· Product identifier
  · Trade name: Remover PG
  · Product number: G050200
  · Application of the substance / the mixture Photoresist remover

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA

· Information department:
  Product Safety
  Email: productsafety@microchem.com
  · Emergency telephone number:
    MicroChem Corp : 617-965-5511
    Chemtrec USA Emergency : 800-424-9300
    Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

· Classification of the substance or mixture
  GHS08 Health hazard
  Repr. 1B H360 May damage fertility or the unborn child.

  GHS07
  Skin Irrit. 2 H315 Causes skin irritation.
  Eye Irrit. 2A H319 Causes serious eye irritation.
  STOT SE 3 H335 May cause respiratory irritation.
  H227 Combustible liquid.

· Label elements
  · GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
  · Hazard pictograms

  GHS07 GHS08

· Signal word Danger
  · Hazard-determining components of labeling:
    N-methyl-2-pyrrolidinone
  · Hazard statements
    H227 Combustible liquid.
    H315 Causes skin irritation.
    H319 Causes serious eye irritation.
    H360 May damage fertility or the unborn child.

(Contd. on page 2)
Trade name: Remover PG

H335 May cause respiratory irritation.

- **Precautionary statements**
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P201 Obtain special instructions before use.
  - P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  - P308+P313 IF exposed or concerned: Get medical advice/attention.
  - P337+P313 If eye irritation persists: Get medical advice/attention.
  - P370+P378 In case of fire: Use for extinction: CO2, powder or water spray.
  - P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Classification system:**
  - NFPA ratings (scale 0 - 4)
    - Health = 2
    - Fire = 1
    - Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    - Health = *2
    - Fire = 1
    - Reactivity = 0

- **Other hazards**
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.

### 3 Composition/information on ingredients

- **Chemical characterization:** Mixtures

- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>PBT</th>
<th>vPvB</th>
<th>Conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4</td>
<td>N-methyl-2-pyrrolidinone</td>
<td>Repr. 1B, H360; Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335; H227</td>
<td>99.995%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proprietary Surfactant</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2, H319</td>
<td>0.1-1.0%</td>
<td></td>
</tr>
</tbody>
</table>

- **SVHC**

<table>
<thead>
<tr>
<th>Component</th>
<th>Conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4</td>
<td>N-methyl-2-pyrrolidinone</td>
</tr>
</tbody>
</table>

### 4 First-aid measures

- **Description of first aid measures**
  - **After inhalation:**
    - Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
  - **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
  - **After eye contact:** Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
Safety Data Sheet
acc. to OSHA HCS

Trade name: Remover PG

After swallowing:
Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.

Information for doctor:
Most important symptoms and effects, both acute and delayed: No further relevant information available.
Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents:
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Special hazards arising from the substance or mixture: No further relevant information available.
Advice for firefighters
Protective equipment: Wear SCBA.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Keep away from ignition sources.
Environmental precautions: Do not allow to enter sewers/surface or ground water.
Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Ensure adequate ventilation.
Dispose contaminated material as waste according to Section 13.
Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling:
Precautions for safe handling
Ensure good ventilation/exhaust at the workplace.
Open and handle container with care.
Prevent formation of aerosols.
Store in cool, dry place in tightly closed containers.
Information about protection against explosions and fires:
Keep respirator available.
Keep ignition sources away - Do not smoke.

Conditions for safe storage, including any incompatibilities

Storage:
Requirements to be met by storerooms and containers:
Store in a cool location.
Suitable material for receptacles and pipes: steel or stainless steel.
Information about storage in one common storage facility: Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.

(Contd. of page 2)
This product is hygroscopic.

- **Specific end use(s)** No further relevant information available.

### 8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.

- **Control parameters**

<table>
<thead>
<tr>
<th>Component</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4 N-methyl-2-pyrrolidinone</td>
<td>WEEL 10 ppm Skin</td>
</tr>
</tbody>
</table>

- **Ingredients with biological limit values:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4 N-methyl-2-pyrrolidinone</td>
<td>BEI 100 mg/L Medium: urine Time: end of shift Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone</td>
</tr>
</tbody>
</table>

- **Additional information:** The lists that were valid during the creation were used as basis.

- **Exposure controls**

- **Personal protective equipment:**
  - **General protective and hygienic measures:**
    - Keep away from food and beverages.
    - Immediately remove all soiled and contaminated clothing.
    - Wash hands before breaks and at the end of work.
    - Avoid contact with the eyes and skin.
    - Do not inhale gases / fumes / aerosols.
    - Pregnant women should strictly avoid inhalation or skin contact.
  - **Respiratory equipment:**
    - In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
  - **Protection of hands:**

  Protective gloves
  
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
  
  Contact glove manufacturer for break-through time.

  - **Material of gloves** Butyl rubber, BR
  - **Penetration time of glove material** Contact glove manufacturer for break-through time.
  - **Eye protection:**

  Tightly sealed goggles
### 9 Physical and chemical properties

- **Appearance:**
  - **Form:** Liquid
  - **Color:** Clear to light yellow
- **Odor:** Amine-like
- **Odour threshold:** Not determined.
- **pH-value at 20 °C (68 °F):** l. basisch
- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 202 °C (396 °F)
- **Flash point:** 86 °C (187 °F)
- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:** 270 °C (518 °F)
- **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not selfigniting.
- **Danger of explosion:** Not determined.
- **Explosion limits:**
  - **Lower:** 1.3 Vol %
  - **Upper:** 9.5 Vol %
- **Vapor pressure at 20 °C (68 °F):** 0.39-0.43 hPa (0-0 mm Hg)
- **Density at 25 °C (77 °F):** 1.030 g/cm³ (8.595 lbs/gal)
- **Relative density** Not determined.
- **Vapour density** Not determined.
- **Evaporation rate** 0.03 (BuAc=1)
- **Solubility in / Miscibility with**
  - **Water:** Fully miscible.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.
- **Other information** No further relevant information available.

### 10 Stability and reactivity

- **Reactivity**
- **Chemical stability** Stable under normal use conditions
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** Strong oxidizing agents
- **Hazardous decomposition products:** Carbon monoxide and carbon dioxide
11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
  - LD/LC50 values that are relevant for classification:
    872-50-4 N-methyl-2-pyrrolidinone
    | Physical State | LD50/LC50 | Value |
    |---------------|-----------|-------|
    | Oral          | LD50      | 3914 mg/kg (Rat) |
    | Dermal        | LD50      | 8000 mg/kg (rabbit) |
    | Inhalative    | LC50/4 h  | >5.0 mg/l (Rat)   |
- Primary irritant effect:
  - on the skin: Irritant to skin and mucous membranes.
  - on the eye: Irritating effect.
  - Sensitization: No sensitizing effects known.
  - Experience with humans: No further relevant information available.
- Additional toxicological information:
The product shows the following dangers according to internally approved calculation methods for preparations:
  - Irritant

- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    None of the ingredients are listed.
  - NTP (National Toxicology Program)
    None of the ingredients are listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity:
    872-50-4 N-methyl-2-pyrrolidinone
    | Parameter     | Value            |
    |---------------|------------------|
    | EC50/24 h     | >1000 mg/l (daphnia magna) |
    | LC50/96 h     | >500 mg/l (Leuciscus idus) |
- Persistence and degradability: No further relevant information available.
- Behavior in environmental systems:
- Bioaccumulative potential: No further relevant information available.
- Mobility in soil: No further relevant information available.
- Additional ecological information:
- General notes:
  Water hazard class 1 (Self-assessment): slightly hazardous for water
  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.
  - Other adverse effects: No further relevant information available.
### 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
  Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system. Disposal must be made in accordance with Federal, State, and Local regulations.
- **Uncleaned packagings:**
  **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

### 14 Transport information

<table>
<thead>
<tr>
<th><strong>UN-Number</strong></th>
<th>Not Regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOT, ADR, ADN, IMDG, IATA</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>DOT, ADR, ADN, IMDG, IATA</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>DOT, ADR, ADN, IMDG, IATA</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>DOT, ADR, IMDG, IATA</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>Environmental hazards:</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Marine pollutant:</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Transport/Additional information:</strong></td>
<td>Not Regulated</td>
</tr>
<tr>
<td><strong>UN &quot;Model Regulation&quot;:</strong></td>
<td>Not Regulated</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Sara**
  - **Section 355 (extremely hazardous substances):**
    None of the ingredients are listed.
  - **Section 313 (Specific toxic chemical listings):**
    872-50-4 N-methyl-2-pyrrolidinone
  - **TSCA (Toxic Substances Control Act):**
    All ingredients are listed or comply with TSCA regulations.
  - **Proposition 65**
    - **Chemicals known to cause cancer:**
      None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for females:**
      None of the ingredients are listed.
Trade name: Remover PG

- Chemicals known to cause reproductive toxicity for males:
  None of the ingredients are listed.

- Chemicals known to cause developmental toxicity:
  872-50-4 N-methyl-2-pyrrolidinone

- Carcinogenic categories
  - EPA (Environmental Protection Agency)
    None of the ingredients are listed.
  - TLV (Threshold Limit Value established by ACGIH)
    None of the ingredients are listed.
  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    None of the ingredients are listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    None of the ingredients are listed.

- Massachusetts State Right To Know List
  872-50-4 N-methyl-2-pyrrolidinone

- New Jersey State Right To Know List
  872-50-4 N-methyl-2-pyrrolidinone

- Pennsylvania Hazardous Substances List
  872-50-4 N-methyl-2-pyrrolidinone

- California SCAQMD Rule 443.1 VOC’s: 1026 g/l; vapor pressure 0.3 mm Hg 20C

- GHS label elements: The product is classified and labeled according to the Globally Harmonized System (GHS).

- Hazard pictograms
  - GHS07
  - GHS08

- Signal word: Danger

- Hazard-determining components of labeling:
  N-methyl-2-pyrrolidinone

- Hazard statements
  H227 Combustible liquid.
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.
  H360 May damage fertility or the unborn child.
  H335 May cause respiratory irritation.

- Precautionary statements
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P201 Obtain special instructions before use.
  P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  P308+P313 IF exposed or concerned: Get medical advice/attention.
  P337+P313 If eye irritation persists: Get medical advice/attention.
  P370+P378 In case of fire: Use for extinction: CO2, powder or water spray.
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 9)
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- Department issuing MSDS: Product safety department
- Contact: Mr. Cole

Revision History:
The business address of the manufacturer in Section 1 was updated. The contact person in Section 16 was updated.

- Date of preparation / last revision 12/16/2014 / 2
- Abbreviations and acronyms:
  RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  ICAO: International Civil Aviation Organization
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  ELINCS: European List of Notified Chemical Substances
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
1 Identification of the substance/mixture and of the company

· **Product identifier**

· **Trade name:** SU-8 2000 Series Resists

· **Product number:**
  Y111004, Y111007, Y111014, Y111022, Y111029, Y111045, Y111053, Y111058, Y111064, Y111069, Y111070, Y111072, Y111074, Y111075, Y111077

· **Application of the substance / the mixture** Photoresist

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**
  MicroChem Corp.
  200 Flanders Road
  Westborough, MA 01581 USA

· **Information department:**
  Product Safety
  Email: productsafety@microchem.com

· **Emergency telephone number:**
  MicroChem Corp: 617-965-5511
  Chemtrec USA Emergency: 800-424-9300
  Chemtrec International Emergency: 703-527-3887

2 Hazard(s) identification

· **Classification of the substance or mixture**

  - **GHS02 Flame**

    Flam. Liq. 3 H226 Flammable liquid and vapor.

  - **GHS09 Environment**

    Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects.

  - **GHS07**

    Acute Tox. 4 H302 Harmful if swallowed.
    Acute Tox. 4 H332 Harmful if inhaled.
    Skin Irrit. 2 H315 Causes skin irritation.
    Eye Irrit. 2A H319 Causes serious eye irritation.
    Skin Sens. 1 H317 May cause an allergic skin reaction.

· **Label elements**

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**

  - GHS02
  - GHS07
  - GHS09

(Contd. on page 2)
· Signal word Warning

· Hazard-determining components of labeling:
  Cyclopentanone
  Epoxy resin
  Sulforom, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluoroantimonate (1-)] (1:2)
  Sulforom, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)

· Hazard statements
  H226 Flammable liquid and vapor.
  H302+H332 Harmful if swallowed or if inhaled.
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.
  H317 May cause an allergic skin reaction.
  H411 Toxic to aquatic life with long lasting effects.

· Precautionary statements
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P261 Avoid breathing dust/fume/gas/mist/vapors/spray
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P273 Avoid release to the environment.
  P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P304+P341 If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
  P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
  P337+P313 If eye irritation persists: Get medical advice/attention.
  P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  P302+P352 IF ON SKIN: Wash with plenty of soap and water.
  P403+P235 Store in a well-ventilated place. Keep cool.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· Classification system:
  NFPA ratings (scale 0 - 4)
  Health = 2
  Fire = 3
  Reactivity = 0

· HMIS-ratings (scale 0 - 4)
  Health = 2
  Fire = 3
  Reactivity = 0

· Other hazards
  · Results of PBT and vPvB assessment
    · PBT: Not applicable.
    · vPvB: Not applicable.
Trade name: SU-8 2000 Series Resists

(Contd. of page 2)

### 3 Composition/information on ingredients

- **Chemical characterization:** Mixtures
- **Description:** Mixture of the substances listed below with nonhazardous additions.

#### Dangerous components:

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Description</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>28906-96-9</td>
<td>Epoxy resin</td>
<td>3-75%</td>
</tr>
<tr>
<td>120-92-3</td>
<td>Cyclopentanone</td>
<td>15-96%</td>
</tr>
<tr>
<td>108-32-7</td>
<td>Propylene carbonate</td>
<td>0.1-5%</td>
</tr>
<tr>
<td>89452-37-9</td>
<td>Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluoroantimonate (1-) (1:2)]</td>
<td>0.05-2.5%</td>
</tr>
<tr>
<td>71449-78-0</td>
<td>Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate (1-) (1:1)</td>
<td>0.05-2.5%</td>
</tr>
</tbody>
</table>

### 4 First-aid measures

- **Description of first aid measures**
- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:**
  Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**
  Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.
- **After swallowing:**
  Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
- **Information for doctor:**
  - Most important symptoms and effects, both acute and delayed: No further relevant information available.
  - Indication of any immediate medical attention and special treatment needed: Treat symptomatically.

### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
  - Alcohol resistant foam
  - Fire-extinguishing powder
  - Carbon dioxide
- **For safety reasons unsuitable extinguishing agents:**
  - Water with full jet
  - Water
- **Special hazards arising from the substance or mixture:** No further relevant information available.

(Contd. on page 4)
Trade name: SU-8 2000 Series Resists

6 Accidental release measures

· Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
  Keep away from ignition sources

· Environmental precautions:
  Do not allow product to reach sewage system or any drains.
  Inform respective authorities in case of seepage into water course or sewage system.
  Do not allow to enter sewers/surface or ground water.

· Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Dispose contaminated material as waste according to Section 13.
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents

· Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

· Handling:
  · Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Prevent formation of aerosols.
  · Information about protection against explosions and fires:
    Keep ignition sources away - Do not smoke.
    Use explosion-proof apparatus / fittings and spark-proof tools.
    Protect against electrostatic charges.

· Conditions for safe storage, including any incompatibilities

· Storage:
  · Requirements to be met by storerooms and containers:
    Due to photo-sensitivity, store product in brown-glass or stainless steel receptacles.
    Store in a cool location.
  · Information about storage in one common storage facility:
    Do not store together with alkalis (caustic solutions).
    Do not store together with oxidizing and acidic materials.
  · Further information about storage conditions:
    Keep container well-sealed in cool, dry location.
    Protect from heat and direct sunlight.
    Store receptacle in a well ventilated area.

· Specific end use(s)
  No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.
Trade name: SU-8 2000 Series Resists

- Control parameters
  - Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV TWA</th>
<th>NIOSH IDLH</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-,(OC-6-11)-hexafluoroantimonate (1-) (1:2)</td>
<td>Long-term value: 0.5 mg/m³</td>
<td>Long-term value: 50 mg/m³</td>
<td>Long-term value: 0.5 mg/m³</td>
</tr>
<tr>
<td>71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)</td>
<td>ACGIH TLV TWA: Long-term value: 0.5 mg/m³</td>
<td>Long-term value: 50 mg/m³</td>
<td>Long-term value: 0.5 mg/m³</td>
</tr>
</tbody>
</table>

- Additional information: The lists that were valid during the creation were used as basis.

- Exposure controls
- Personal protective equipment:
- General protective and hygienic measures:
  - Keep away from food and beverages.
  - Immediately remove all soiled and contaminated clothing.
  - Wash hands before breaks and at the end of work.
  - Avoid contact with the eyes and skin.

- Respiratory equipment:
  - In case of low exposure, use cartridge respirator.
  - In case of intensive or longer exposure, use SCBA.

- Protection of hands:
  - Protective gloves
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  - Material of gloves
    - Nitrile rubber, NBR
    - Butyl rubber, BR
  - Penetration time of glove material Contact glove manufacture for break-through time.
  - Eye protection:
    - Tightly sealed goggles

9 Physical and chemical properties

- Information on basic physical and chemical properties
- General Information
  - Appearance:
    - Form: Liquid
    - Color: Clear to light yellow
    - Odor: Sweet
    - Odor threshold: Not determined.
  - pH-value: Not determined.
42.0.9

Change in condition

- Melting point/Melting range: Undetermined.
- Boiling point/Boiling range: 130 °C (266 °F)

- Flash point: 30 °C (86 °F)
- Flammability (solid, gaseous): Not applicable.
- Ignition temperature: 430 °C (806 °F)
- Decomposition temperature: Not determined.
- Auto igniting: Product is not selfigniting.
- Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.
- Vapor pressure: Not determined.
- Density:
  - Relative density: Not determined.
  - Vapor density: Not determined.
  - Evaporation rate: 1.6-2.3 (BuAc=1)
- Solubility in / Miscibility with Water: Water miscible No
- Partition coefficient (n-octanol/water): Not determined.
- Viscosity:
  - Dynamic: Not determined.
  - Kinematic: Not determined.

Other information

Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Sp. Grav.</th>
<th>Vol. (% by wt.)</th>
<th>VOC (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU-8 2000.1</td>
<td>1.00</td>
<td>94-98</td>
<td>960</td>
</tr>
<tr>
<td>SU-8 2000.2</td>
<td>1.00</td>
<td>90-95</td>
<td>930</td>
</tr>
<tr>
<td>SU-8 2000.5</td>
<td>1.07</td>
<td>85-90</td>
<td>920</td>
</tr>
<tr>
<td>SU-8 2001</td>
<td>1.100</td>
<td>80-85</td>
<td>860</td>
</tr>
<tr>
<td>SU-8 2002</td>
<td>1.123</td>
<td>70-75</td>
<td>800</td>
</tr>
<tr>
<td>SU-8 2005</td>
<td>1.164</td>
<td>50-55</td>
<td>640</td>
</tr>
<tr>
<td>SU-8 2007</td>
<td>1.175</td>
<td>45-50</td>
<td>550</td>
</tr>
<tr>
<td>SU-8 2010</td>
<td>1.187</td>
<td>40-45</td>
<td>500</td>
</tr>
<tr>
<td>SU-8 2015</td>
<td>1.200</td>
<td>35-40</td>
<td>430</td>
</tr>
<tr>
<td>SU-8 2025</td>
<td>1.219</td>
<td>30-35</td>
<td>380</td>
</tr>
<tr>
<td>SU-8 2035</td>
<td>1.227</td>
<td>20-30</td>
<td>370</td>
</tr>
<tr>
<td>SU-8 2050</td>
<td>1.233</td>
<td>20-30</td>
<td>345</td>
</tr>
<tr>
<td>SU-8 2075</td>
<td>1.236</td>
<td>20-30</td>
<td>320</td>
</tr>
<tr>
<td>SU-8 2100</td>
<td>1.237</td>
<td>20-30</td>
<td>310</td>
</tr>
<tr>
<td>SU-8 2150</td>
<td>1.238</td>
<td>20-30</td>
<td>285</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

- Reactivity: No further relevant information available.
Trade name: SU-8 2000 Series Resists

- **Chemical stability**: Stable under normal use conditions
- **Thermal decomposition / conditions to be avoided**: No decomposition if used according to specifications.
- **Possibility of hazardous reactions**: Exothermic polymerization.
- **Conditions to avoid**:
  - Heat, flames and sparks. Extremes of temperature and direct sunlight.
  - Contact with incompatible materials.
- **Incompatible materials**: Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products**: Carbon monoxide, Corrosive gases/vapors, Danger of toxic pyrolysis products, Antimony oxide

### 11 Toxicological information

- **Information on toxicological effects**
  - **Acute toxicity**:
    - **LD/LC50 values that are relevant for classification**:
      | 28906-96-9 Epoxy resin | 120-92-3 Cyclopentanone | 108-32-7 Propylene carbonate |
      | Oral LD50 >2000 mg/kg (Rat) | Oral LD50 1820 mg/kg (Rat) | Oral LD50 >29000 mg/kg (Rat) |
      | Dermal LD50 >2000 mg/kg (rabbit) | Dermal LD50 >2000 mg/kg (rabbit) | Dermal LD50 >20.000 mg/kg (rabbit) |
      | Inhalative LC50 >5 mg/L (Rat) | Inhalative LC50/4 h 19.5 mg/l (Rat) |
  - **Specific symptoms in biological assay**:
    - Formaldehyde, polymer with (chloromethyl)oxirane and 4,4'-(1-methylethylidene)bis[phenol] CAS 28906-96-9:
      This material was mutagenic in the Ames bacterial assay and showed a positive result in a mammalian cell chromosomal aberration test.
      Mixture of triarylsulfonium/hexafluoroantimonate salts (CAS 71449-78-0 and 89452-37-9) in propylene carbonate (CAS 108-32-7):
      This material was mutagenic in the Ames bacterial assay. It is inactive, however, in the in vivo mouse micronucleus test.
      Propylene carbonate (CAS 108-32-7):
      This substance had a negative Ames test with or without metabolic activation.
  - **Primary irritant effect**:
    - **on the skin**: Irritant to skin and mucous membranes.
    - **on the eye**: Irritating effect.
    - **Sensitization**: Sensitization possible through skin contact.
    - **Additional toxicological information**: Irritant

### Carcinogenic categories

- IARC (International Agency for Research on Cancer)
  - None of the ingredients are listed.
12 Ecological information

· Toxicity
  · Aquatic toxicity:

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50/24 h</th>
<th>LC50/48 hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>28906-96-9 Epoxy resin</td>
<td>4.4 mg/l (daphnia)</td>
<td>0.68 mg/L (daphnia)</td>
</tr>
<tr>
<td>89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-, (OC-6-11)-hexafluoroantimonate (1-) (1:2)]</td>
<td>4.4 mg/l (daphnia)</td>
<td>0.68 mg/L (daphnia)</td>
</tr>
<tr>
<td>71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)</td>
<td>4.4 mg/l (daphnia)</td>
<td>0.68 mg/L (daphnia)</td>
</tr>
</tbody>
</table>

· Persistence and degradability: No further relevant information available.
· Behavior in environmental systems:
  · Bioaccumulative potential: No further relevant information available.
· Mobility in soil: No further relevant information available.
· Ecotoxicological effects:
  · Remark: Toxic for fish
· Additional ecological information:
  · General notes:

  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  Also poisonous for fish and plankton in water bodies.
  Toxic for aquatic organisms
  · Results of PBT and vPvB assessment
    · PBT: Not applicable.
    · vPvB: Not applicable.
· Other adverse effects: No further relevant information available.

13 Disposal considerations

· Waste treatment methods
· Recommendation:
  Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
  Disposal must be made in accordance with Federal, State, and Local regulations.
· Uncleaned packagings:
  · Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.
### 14 Transport information

<table>
<thead>
<tr>
<th>DOT, ADR, IMDG, IATA</th>
<th>UN1866</th>
</tr>
</thead>
</table>

- **UN proper shipping name**: Resin solution
- **DOT, ADR**: RESIN SOLUTION (Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1), Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluoroantimonate (1-) (1:2)), MARINE POLLUTANT
- **IMDG**: RESIN SOLUTION
- **IATA**: **

<table>
<thead>
<tr>
<th>DOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Flammable liquids</td>
</tr>
<tr>
<td>Label</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADR, IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Flammable liquids</td>
</tr>
<tr>
<td>Label</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT, ADR, IMDG, IATA</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group</td>
<td></td>
</tr>
<tr>
<td>Label</td>
<td></td>
</tr>
<tr>
<td>DOT, ADR, IMDG, IATA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental hazards:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine pollutant:</td>
</tr>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special precautions for user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning: Flammable liquids</td>
</tr>
<tr>
<td>Danger code (Kemler):</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>EMS Number:</td>
</tr>
<tr>
<td>F-E,S-D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN &quot;Model Regulation&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1866, Resin solution, 3, III</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

- **Sara**

<table>
<thead>
<tr>
<th>Section 355 (extremely hazardous substances):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients are listed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 313 (Specific toxic chemical listings):</th>
</tr>
</thead>
<tbody>
<tr>
<td>89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluoroantimonate (1-) (1:2)</td>
</tr>
<tr>
<td>71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)</td>
</tr>
</tbody>
</table>

(Contd. on page 10)
· TSCA (Toxic Substances Control Act):
  All ingredients are listed or comply with TSCA regulations.

· Proposition 65

· Chemicals known to cause cancer:
  None of the ingredients are listed.

· Chemicals known to cause reproductive toxicity for females:
  None of the ingredients are listed.

· Chemicals known to cause reproductive toxicity for males:
  None of the ingredients are listed.

· Chemicals known to cause developmental toxicity:
  None of the ingredients are listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)
  None of the ingredients are listed.

· TLV (Threshold Limit Value established by ACGIH)
  None of the ingredients are listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)
  None of the ingredients are listed.

· Massachusetts State Right To Know List
  120-92-3 Cyclopentanone

· New Jersey State Right To Know List
  120-92-3 Cyclopentanone

· Pennsylvania Hazardous Substances List
  120-92-3 Cyclopentanone

· California SCAQMD Rule 443.1 VOC's: See Table 1 - Section 9

· GHS label elements
  The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms

  GHS02   GHS07   GHS09

· Signal word
  Warning

· Hazard-determining components of labeling:
  Cyclopentanone
  Epoxy resin
  Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl,(OC-6-11)-hexafluoroantimonate (1-)] (1:2)
  Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)

· Hazard statements
  H226  Flammable liquid and vapor.
  H302+H332 Harmful if swallowed or if inhaled.
  H315  Causes skin irritation.
  H319  Causes serious eye irritation.
  H317  May cause an allergic skin reaction.
  H411  Toxic to aquatic life with long lasting effects.
## Trade name: SU-8 2000 Series Resists

### Precautionary statements

- **P210** Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- **P261** Avoid breathing dust/fume/gas/mist/vapors/spray
- **P280** Wear protective gloves/protective clothing/eye protection/face protection.
- **P273** Avoid release to the environment.
- **P301+P310** IF SWALLOWED: Immediately call a POISON CENTER/doctor.
- **P305+P351+P338** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P304+P341** If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
- **P333+P313** If skin irritation or rash occurs: Get medical advice/attention.
- **P337+P313** If eye irritation persists: Get medical advice/attention.
- **P370+P378** In case of fire: Use for extinction: Alcohol resistant foam.
- **P370+P378** In case of fire: Use for extinction: Fire-extinguishing powder.
- **P370+P378** In case of fire: Use for extinction: Carbon dioxide.
- **P302+P352** IF ON SKIN: Wash with plenty of soap and water.
- **P403+P235** Store in a well-ventilated place. Keep cool.
- **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

### Chemical safety assessment:

A Chemical Safety Assessment has not been carried out.

## 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing SDS**: Product safety department
- **Contact**: Mr. Cole

### Revision History:

The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.

### Date of preparation / last revision: 05/18/2016 / 6

### Abbreviations and acronyms:

- **RID**: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- **ICAO**: International Civil Aviation Organisation
- **ADR**: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- **IMDG**: International Maritime Code for Dangerous Goods
- **DOT**: US Department of Transportation
- **IATA**: International Air Transport Association
- **ACGIH**: American Conference of Governmental Industrial Hygienists
- **EINECS**: European Inventory of Existing Commercial Chemical Substances
- **ELINCS**: European List of Notified Chemical Substances
- **CAS**: Chemical Abstracts Service (division of the American Chemical Society)
- **NFPA**: National Fire Protection Association
- **HMIS**: Hazardous Materials Identification System (USA)
- **LC50**: Lethal concentration, 50 percent
- **LD50**: Lethal dose, 50 percent
- **PBT**: Persistent, Bioaccumulative and Toxic
- **vPvB**: very Persistent and very Bioaccumulative
- **NIOSH**: National Institute for Occupational Safety
- **OSHA**: Occupational Safety & Health
- **TLV**: Threshold Limit Value
- **PEL**: Permissible Exposure Limit
- **REL**: Recommended Exposure Limit
- **Flam. Liq. 3**: Flammable liquids, Hazard Category 3
- **Acute Tox. 4**: Acute toxicity, Hazard Category 4
- **Skin Irrit. 2**: Skin corrosion/irritation, Hazard Category 2

(Contd. on page 12)
**Trade name: SU-8 2000 Series Resists**

<table>
<thead>
<tr>
<th>Hazard Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2</td>
</tr>
<tr>
<td>Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A</td>
</tr>
<tr>
<td>Skin Sens. 1: Sensitisation - Skin, Hazard Category 1</td>
</tr>
<tr>
<td>Aquatic Acute 1: Hazardous to the aquatic environment - Acute Hazard, Category 1</td>
</tr>
<tr>
<td>Aquatic Chronic 1: Hazardous to the aquatic environment - Chronic Hazard, Category 1</td>
</tr>
<tr>
<td>Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2</td>
</tr>
</tbody>
</table>
1 Identification of the substance/mixture and of the company

- **Product identifier**
  - **Trade name:** SU-8 3000 Series Resists
  - **Product number:** Y311075, Y311074, Y311072, Y311060, Y311049
  - **Application of the substance / the mixture:** Photoresist

- **Details of the supplier of the safety data sheet**
  - **Manufacturer/Supplier:** MicroChem Corp.
  - **Address:** 200 Flanders Road, Westborough, MA 01581 USA
  - **Information department:** Product Safety
  - **Email:** productsafety@microchem.com
  - **Emergency telephone number:**
    - MicroChem Corp.: 617-965-5511
    - Chemtrec USA Emergency: 800-424-9300
    - Chemtrec International Emergency: 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**
  - **GHS label elements**
    - **GHS02 Flame**
      - Flam. Liq. 3 H226 Flammable liquid and vapor.
    - **GHS08 Health hazard**
      - Muta. 2 H341 Suspected of causing genetic defects.
    - **GHS09 Environment**
      - Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects.
    - **GHS07**
      - Acute Tox. 4 H302 Harmful if swallowed.
      - Acute Tox. 4 H332 Harmful if inhaled.
      - Skin Irrit. 2 H315 Causes skin irritation.
      - Eye Irrit. 2A H319 Causes serious eye irritation.
      - Skin Sens. 1 H317 May cause an allergic skin reaction.

- **Label elements**
  - **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

(Contd. on page 2)
Trade name: SU-8 3000 Series Resists

- **Hazard pictograms**
  - GHS02
  - GHS07
  - GHS08
  - GHS09

- **Signal word** Warning

- **Hazard-determining components of labeling:**
  - Cyclopentanone
  - Epoxy resin
  - [3-(2,3-epoxypropoxy)propyl]trimethoxysilane
  - Epoxy novolac polymer

- **Hazard statements**
  - H226 Flammable liquid and vapor.
  - H302+H332 Harmful if swallowed or if inhaled.
  - H315 Causes skin irritation.
  - H319 Causes serious eye irritation.
  - H317 May cause an allergic skin reaction.
  - H341 Suspected of causing genetic defects.
  - H411 Toxic to aquatic life with long lasting effects.

- **Precautionary statements**
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P273 Avoid release to the environment.
  - P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
  - P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - P304+P341 If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
  - P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
  - P337+P313 If eye irritation persists: Get medical advice/attention.
  - P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  - P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  - P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  - P302+P352 IF ON SKIN: Wash with plenty of soap and water.
  - P403+P235 Store in a well-ventilated place. Keep cool.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Additional information:**
  - 15.2 % of the mixture consists of component(s) of unknown toxicity.

- **Classification system:**
  - **NFPA ratings (scale 0 - 4)**
    - Health = 2
    - Fire = 3
    - Reactivity = 0
  - **HMIS-ratings (scale 0 - 4)**
    - Health = 2
    - Fire = 3
    - Reactivity = 0
Trade name: SU-8 3000 Series Resists

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Description</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>28906-96-9 Epoxy resin</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317</td>
<td>25-50%</td>
</tr>
<tr>
<td>120-92-3 Cyclopentanone</td>
<td>Flam. Liq. 3, H226; Acute Tox. 4, H302; Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319</td>
<td>10-25%</td>
</tr>
<tr>
<td>244772-00-7 Cycloaliphatic Epoxy Resin</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2A, H319</td>
<td>10-25%</td>
</tr>
<tr>
<td>108-32-7 Propylene carbonate</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2, H319</td>
<td>1-5%</td>
</tr>
<tr>
<td>Proprietary polyglycidyl ether</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317</td>
<td>1-5%</td>
</tr>
<tr>
<td>89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluorooantimonate (1-): 1-2)</td>
<td>Aquatic Acute 1, H400; Aquatic Chronic 1, H410; Skin Sens. 1, H317</td>
<td>1-5%</td>
</tr>
<tr>
<td>71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-): 1:1)</td>
<td>Aquatic Acute 1, H400; Aquatic Chronic 1, H410; Skin Sens. 1, H317</td>
<td>1-5%</td>
</tr>
<tr>
<td>2530-83-8 [3-(2,3-epoxypropoxy)propyl]trimethoxysilane</td>
<td>Muta. 2, H341; Eye Dam. 1, H318; Aquatic Chronic 3, H412</td>
<td>1-5%</td>
</tr>
</tbody>
</table>

4 First-aid measures

Description of first aid measures

General information:
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
Immediately remove any clothing soiled by the product.

After inhalation: Supply fresh air and to be sure call for a doctor.

After skin contact:
If skin irritation continues, consult a doctor.
Immediately wash with water and soap and rinse thoroughly.

After eye contact:
Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.

After swallowing: Do not induce vomiting; immediately call for medical help.

Information for doctor:
Most important symptoms and effects, both acute and delayed
No further relevant information available.
5 Fire-fighting measures

- Extinguishing media
- Suitable extinguishing agents:
  - Alcohol resistant foam
  - Fire-extinguishing powder
  - Carbon dioxide
- For safety reasons unsuitable extinguishing agents:
  - Water with full jet
  - Water
- Special hazards arising from the substance or mixture: No further relevant information available.
- Advice for firefighters
  - Protective equipment: Wear SCBA.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  - Wear protective equipment. Keep unprotected persons away.
  - Ensure adequate ventilation
  - Keep away from ignition sources
- Environmental precautions:
  - Do not allow product to reach sewage system or any drains.
  - Inform respective authorities in case of seepage into water course or sewage system.
  - Do not allow to enter sewers/ surface or ground water.
- Methods and material for containment and cleaning up:
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Ensure adequate ventilation.
  - Do not flush with water or aqueous cleansing agents
- Reference to other sections
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.

7 Handling and storage

- Handling:
  - Precautions for safe handling
    - Ensure good ventilation/exhaust at the workplace.
    - Prevent formation of aerosols.
    - Keep away from heat and direct sunlight.
  - Information about protection against explosions and fires:
    - Keep ignition sources away - Do not smoke.
    - Use explosion-proof apparatus / fittings and spark-proof tools.
    - Protect against electrostatic charges.
- Conditions for safe storage, including any incompatibilities
- Storage:
  - Requirements to be met by storerooms and containers:
    - Due to photo-sensitivity, store product in brown-glass or stainless steel receptacles.
Trade name: SU-8 3000 Series Resists

- Information about storage in one common storage facility:
  Do not store together with oxidizing and acidic materials.
  Do not store together with alkalis (caustic solutions).
  Do not store together with amines.
- Further information about storage conditions:
  Keep container well-sealed in cool, dry location.
  Protect from heat and direct sunlight.
  Store receptacle in a well ventilated area.
- Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters

<table>
<thead>
<tr>
<th>Components with limit values that require monitoring at the workplace:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-(OC-6-11)-hexafluoroantimonate (1-) (1:2)</strong></td>
</tr>
<tr>
<td>ACGIH TLV TWA</td>
</tr>
<tr>
<td>NIOSH IDLH</td>
</tr>
<tr>
<td>OSHA PEL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV TWA</td>
</tr>
<tr>
<td>NIOSH IDLH</td>
</tr>
<tr>
<td>OSHA PEL</td>
</tr>
</tbody>
</table>

- Additional information: The lists that were valid during the creation were used as basis.
- Exposure controls
  - Personal protective equipment:
    - General protective and hygienic measures:
      Keep away from food and beverages.
      Immediately remove all soiled and contaminated clothing.
      Wash hands before breaks and at the end of work.
      Avoid contact with the eyes and skin.
    - Respiratory equipment:
      In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
    - Protection of hands:
      Protective gloves
      The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
      - Material of gloves Nitrile rubber, NBR
      - Penetration time of glove material Contact glove manufacture for break-through time.
### 9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**
  - **Form:** Liquid
  - **Color:** Light yellow
- **Odor:** Recognizable
- **Odor threshold:** Not determined.
- **pH-value:** Not determined.
- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 130 °C (266 °F)
- **Flash point:** 30 °C (86 °F)
- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:** 430 °C (806 °F)
- **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not selfigniting.
- **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
- **Explosion limits:**
  - **Lower:** Not determined.
  - **Upper:** Not determined.
- **Vapor pressure:** Not determined.
- **Density:** See other information
- **Vapor density:** Not determined.
- **Evaporation rate:** 1.6-2.3 (BuAc=1)
- **Solubility in / Miscibility with Water:** Water miscible No
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - **Dynamic:** Not determined.
Trade name: SU-8 3000 Series Resists

- Solvent content:
  
- VOC content: See Table 1 below
  
- Other information

<table>
<thead>
<tr>
<th>Name</th>
<th>Sp. Grav.</th>
<th>Vol.(%by wt.)</th>
<th>VOC (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU-8 3005</td>
<td>1.075</td>
<td>48-52</td>
<td>538</td>
</tr>
<tr>
<td>SU-8 3010</td>
<td>1.106</td>
<td>38-42</td>
<td>442</td>
</tr>
<tr>
<td>SU-8 3025</td>
<td>1.143</td>
<td>26-30</td>
<td>320</td>
</tr>
<tr>
<td>SU-8 3035</td>
<td>1.150</td>
<td>24-28</td>
<td>300</td>
</tr>
<tr>
<td>SU-8 3050</td>
<td>1.153</td>
<td>22-27</td>
<td>288</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

- Reactivity: No further relevant information available.

- Chemical stability: Stable under normal use conditions.

- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.

- Possibility of hazardous reactions: Exothermic polymerization.

- Conditions to avoid:
  Heat, flames and sparks. Extremes of temperature and direct sunlight.
  Contact with incompatible materials.

- Incompatible materials: Strong Oxidizing Agents, Strong Bases, Strong Acids, Amines

- Hazardous decomposition products:
  Carbon monoxide
  Carbon dioxide
  Danger of toxic pyrolysis products.
  Corrosive gases/vapors

11 Toxicological information

- Information on toxicological effects

- Acute toxicity:

  - LD/LC50 values that are relevant for classification:

    28906-96-9 Epoxy resin
    Oral LD50 >2000 mg/kg (Rat)
    Dermal LD50 >2000 mg/kg (rabbit)
    Inhalative LC50 > 5 mg/L (Rat)

    2530-83-8 [3-(2,3-epoxypropoxy)propyl]trimethoxysilane
    Oral LD50 > 8030 mg/kg (Rat)
    Dermal LD50 > 4248 mg/kg (Rat)
    Inhalative LC50/4 h > 5.3 mg/l (Rat)

    120-92-3 Cyclopentanone
    Oral LD50 > 1820 mg/kg (Rat)
    Dermal LD50 > 2000 mg/kg (rabbit)
    Inhalative LC50/4 h > 19.5 mg/l (Rat)

    Epoxy novolac polymer
    Oral LD50 > 2000 mg/kg (Rat)

    244772-00-7 Cycloaliphatic Epoxy Resin
    Oral LD50 > 2000 mg/kg (Rat)
Trade name: SU-8 3000 Series Resists

### Proprietary polyglycidyl ether

<table>
<thead>
<tr>
<th>Oral</th>
<th>LD50</th>
<th>&gt;2000 mg/kg (Rat)</th>
</tr>
</thead>
</table>

- **Primary irritant effect:**
  - **on the skin:** Irritant to skin and mucous membranes.
  - **on the eye:** Irritating effect.

- **Sensitization:** Sensitization possible through skin contact.
- **Additional toxicological information:**
  The product shows the following dangers according to internally approved calculation methods for preparations:
  - **Irritant**

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**
  None of the ingredients are listed.

- **NTP (National Toxicology Program)**
  None of the ingredients are listed.

- **OSHA-Ca (Occupational Safety & Health Administration)**
  None of the ingredients are listed.

### 12 Ecological information

- **Toxicity**

  - **Aquatic toxicity:**

    - **28906-96-9 Epoxy resin**
      - \(100 < \text{LC/EC/IC } 50\) \(\leq 1000 \text{ mg/l (algae)}\)
      - \(\leq 1000 \text{ mg/l (fish)}\)
      - \(\leq 1000 \text{ mg/l (invertebrates)}\)

    - **89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-,(OC-6-11)-hexafluoroantimonate (1-) (1:2)**
      - \(\text{LC}_{50}/24 \text{ h} \) \(4.4 \text{ mg/l (daphnia)}\)
      - \(\text{LC}_{50}/48 \text{ hr} \) \(0.68 \text{ mg/L (daphnia)}\)

    - **71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)**
      - \(\text{LC}_{50}/24 \text{ h} \) \(4.4 \text{ mg/l (daphnia)}\)
      - \(\text{LC}_{50}/48 \text{ hr} \) \(0.68 \text{ mg/L (daphnia)}\)

    - **2530-83-8 [3-(2,3-epoxypropoxy)propyl]trimethoxysilane**
      - \(\text{EC}_{50}/48 \text{ h} \) \(30 \text{ mg/l (daphnia magna)}\)
      - \(\text{EC}_{50}/72 \text{ h} \) \(255 \text{ mg/l (Desmodesmus subspicatus (green algae))}\)
      - \(\text{LC}_{50}/96 \text{ h} \) \(55 \text{ mg/l (Cyprinus carpio (common carp))}\)

    - **120-92-3 Cyclopentanone**
      - \(\text{EC}_{50}/48 \text{ h} \) \(3600 \text{ mg/l (Ceriodaphnia dubia (water flea))}\)
      - \(100 \text{ mg/l (daphnia magna)}\)
      - \(\text{EC}_{50}/72 \text{ h} \) \(>100 \text{ mg/l (scenedesmus subspicatus)}\)
      - \(\text{LC}_{50}/48 \text{ hr} \) \(2950 \text{ mg/L (golden orfe)}\)
      - \(\text{LC}_{50}/96 \text{ h} \) \(>100 \text{ mg/l (fish)}\)

- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
Trade name: SU-8 3000 Series Resists

- Ecotoxical effects:
  - Remark: Toxic for fish
- Additional ecological information:
  - General notes:
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
    Also poisonous for fish and plankton in water bodies.
    Toxic for aquatic organisms
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - Other adverse effects No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation:
    Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
    Disposal must be made in accordance with Federal, State, and Local regulations.
- Uncleaned packagings:
  - Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA: UN1866
- UN proper shipping name
  - DOT, ADR
    Resin solution
  - IMDG
    RESIN SOLUTION, MARINE POLLUTANT
  - IATA
    RESIN SOLUTION
- Transport hazard class(es)
  - DOT
    - Class: 3 Flammable liquids
    - Label: 3
  - ADR, IMDG, IATA
    - Class: 3 Flammable liquids
    - Label: 3
**Trade name: SU-8 3000 Series Resists**

| · Packing group                                      | III |
| · DOT, ADR, IMDG, IATA                              |     |
| · Environmental hazards:                            | Product contains environmentally hazardous substances: Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-,(OC-6-11)-hexafluoroantimonate (1-) (1:2) |
| · Marine pollutant:                                  | Yes |
| · Special precautions for user                      | Warning: Flammable liquids |
| · Danger code (Kemler):                             | 33  |
| · EMS Number:                                       | F-E,S-E |
| · Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code | Not applicable. |
| · UN "Model Regulation":                           | UN1866, Resin solution, 3, III |

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **Sara**
    - **Section 355 (extremely hazardous substances):**
      - None of the ingredients are listed.
    - **Section 313 (Specific toxic chemical listings):**
      - 89452-37-9 Sulfonium, (thiodi-4,1-phenylene) bis[diphenyl-,(OC-6-11)-hexafluoroantimonate (1-) (1:2)
      - 71449-78-0 Sulfonium, diphenyl[4-(phenylthio)phenyl]-, (OC-6-11)-hexafluoroantimonate(1-) (1:1)
  - **TSCA (Toxic Substances Control Act):**
    - All ingredients are listed or comply with TSCA regulations.
  - **Proposition 65**
    - **Chemicals known to cause cancer:**
      - None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for females:**
      - None of the ingredients are listed.
    - **Chemicals known to cause reproductive toxicity for males:**
      - None of the ingredients are listed.
    - **Chemicals known to cause developmental toxicity:**
      - None of the ingredients are listed.
  - **Carcinogenic categories**
    - **EPA (Environmental Protection Agency)**
      - None of the ingredients are listed.
    - **TLV (Threshold Limit Value established by ACGIH)**
      - None of the ingredients are listed.
    - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
      - None of the ingredients are listed.
    - **Massachusetts State Right To Know List**
      - 120-92-3 Cyclopentanone
Trade name: SU-8 3000 Series Resists

- New Jersey State Right To Know List
  120-92-3 Cyclopentanone

- Pennsylvania Hazardous Substances List
  120-92-3 Cyclopentanone

- California SCAQMD Rule 443.1 VOC's: See Table 1 - Section 9
- GHS label elements: The product is classified and labeled according to the Globally Harmonized System (GHS).
- Hazard pictograms
  - GHS02
  - GHS07
  - GHS08
  - GHS09

- Signal word: Warning

- Hazard-determining components of labeling:
  - Cyclopentanone
  - Epoxy resin
  - [3-(2,3-epoxypropoxy)propyl]trimethoxysilane
  - Epoxy novolac polymer

- Hazard statements
  - H226: Flammable liquid and vapor.
  - H302+H332: Harmful if swallowed or if inhaled.
  - H315: Causes skin irritation.
  - H319: Causes serious eye irritation.
  - H317: May cause an allergic skin reaction.
  - H341: Suspected of causing genetic defects.
  - H411: Toxic to aquatic life with long lasting effects.

- Precautionary statements
  - P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P261: Avoid breathing dust/fume/gas/mist/vapors/spray
  - P280: Wear protective gloves/protective clothing/eye protection/face protection.
  - P273: Avoid release to the environment.
  - P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
  - P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - P304+P341: If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
  - P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
  - P337+P313: If eye irritation persists: Get medical advice/attention.
  - P370+P378: In case of fire: Use for extinction: Alcohol resistant foam.
  - P370+P378: In case of fire: Use for extinction: Carbon dioxide.
  - P302+P352: IF ON SKIN: Wash with plenty of soap and water.
  - P403+P235: Store in a well-ventilated place. Keep cool.
  - P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

- Chemical safety assessment: A Chemical Safety Assessment has not been carried out.
16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- Department issuing SDS: Product safety department
- Contact: Mr. Cole

- Revision History:
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.
- Date of preparation / last revision: 05/26/2016 / 5
- Abbreviations and acronyms:
  - RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  - ICAO: International Civil Aviation Organisation
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - IMDG: International Maritime Code for Dangerous Goods
  - DOT: US Department of Transportation
  - IATA: International Air Transport Association
  - ACGIH: American Conference of Governmental Industrial Hygienists
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - ELINCS: European List of Notified Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - NFPA: National Fire Protection Association (USA)
  - HMIS: Hazardous Materials Identification System (USA)
  - VOC: Volatile Organic Compounds (USA, EU)
  - LC50: Lethal concentration, 50 percent
  - LDS0: Lethal dose, 50 percent
  - PBT: Persistent, Bioaccumulative and Toxic
  - vPvB: very Persistent and very Bioaccumulative
  - NIOSH: National Institute for Occupational Safety
  - OSHA: Occupational Safety & Health
  - TLV: Threshold Limit Value
  - PEL: Permissible Exposure Limit
  - REL: Recommended Exposure Limit
  - Flam. Liq. 3: Flammable liquids, Hazard Category 3
  - Acute Tox. 4: Acute toxicity, Hazard Category 4
  - Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
  - Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
  - Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
  - Skin Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A
  - Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
  - Mut. 2: Germ cell mutagenicity, Hazard Category 2
  - Aquatic Acute 1: Hazardous to the aquatic environment - Acute Hazard, Category 1
  - Aquatic Chronic 1: Hazardous to the aquatic environment - Chronic Hazard, Category 1
  - Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2
  - Aquatic Chronic 3: Hazardous to the aquatic environment - Chronic Hazard, Category 3
1 Identification of the substance/mixture and of the company

- **Product identifier**
  - **Trade name:** SU-8 Developer
  - **CAS Number:** 108-65-6
  - **EC number:** 203-603-9
  - **Index number:** 607-195-00-7

- **Application of the substance / the mixture** Solvents

- **Details of the supplier of the safety data sheet**
  - **Manufacturer/Supplier:** MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA
  - **Information department:**
    Product Safety
    Email: productsafety@microchem.com
  - **Emergency telephone number:**
    MicroChem Corp : 617-965-5511
    Chemtrec USA Emergency : 800-424-9300
    Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**
  - GHS02 Flame
    Flam. Liq. 3 H226 Flammable liquid and vapor.
  - GHS08 Health hazard
    Repr. 1B H360 May damage fertility or the unborn child.

- **Label elements**
- **GHS label elements**
  The substance is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**
  - GHS02
  - GHS08

- **Signal word** Danger

- **Hazard-determining components of labeling:**
  2-Methoxy-1-propyl acetate

- **Hazard statements**
  H226 Flammable liquid and vapor
  H360 May damage fertility or the unborn child.
Trade name: SU-8 Developer

- Precautionary statements
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P201 Obtain special instructions before use.
  - P308+P313 IF exposed or concerned: Get medical advice/attention.
  - P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  - P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  - P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  - P403+P235 Store in a well-ventilated place. Keep cool.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- Classification system:
  - NFPA ratings (scale 0 - 4)
    - Health = 1
    - Fire = 2
    - Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    - Health = 1
    - Fire = 2
    - Reactivity = 0

- Other hazards
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
  - 108-65-6 1-Methoxy-2-propanol acetate
- Identification number(s)
  - EC number: 203-603-9
  - Index number: 607-195-00-7

- Dangerous components:
  - 70657-70-4 2-Methoxy-1-propyl acetate
    - Flam. Liq. 3, H226; Repr. 1B, H360; STOT SE 3, H335
    - <0.5%
  - 108-65-6 1-Methoxy-2-propanol acetate
    - Flam. Liq. 3, H226
    - >99.5%

4 First-aid measures

- Description of first aid measures
- After inhalation:
  - Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
- After skin contact:
  - Immediately wash with water and soap and rinse thoroughly.
- After eye contact:
  - Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
Trade name: SU-8 Developer

- After swallowing:
  Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
- Information for doctor:
  - Most important symptoms and effects, both acute and delayed: No further relevant information available.
  - Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
  - Suitable extinguishing agents:
    Fire-extinguishing powder
    Alcohol resistant foam
    Carbon dioxide
  - For safety reasons unsuitable extinguishing agents:
    Water with full jet
    Water
- Special hazards arising from the substance or mixture
  Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.
- Advice for firefighters
  - Protective equipment: Wear SCBA.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation
  Keep away from ignition sources
- Environmental precautions:
  Do not allow product to reach sewage system or any drains.
  Inform respective authorities in case of seepage into water course or sewage system.
- Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents
  Dispose contaminated material as waste according to Section 13.
- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- Handling:
  - Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Store in cool, dry place in tightly closed containers.
    Prevent formation of aerosols.
· Information about protection against explosions and fires:
  Keep ignition sources away - Do not smoke.
  Protect against electrostatic charges.
  Use explosion-proof apparatus / fittings and spark-proof tools.

· Conditions for safe storage, including any incompatibilities

· Storage:
  · Requirements to be met by storerooms and containers:
    Store in a cool location.
    Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.
  · Information about storage in one common storage facility: Store away from oxidizing agents.
  · Further information about storage conditions:
    Keep container well-sealed in cool, dry location.
    Store under lock and key and with access restricted to technical experts or their assistants only.

· Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.

· Control parameters

<table>
<thead>
<tr>
<th>Components with limit values that require monitoring at the workplace:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>108-65-6 1-Methoxy-2-propanol acetate</strong></td>
</tr>
<tr>
<td>WEEL 50 ppm</td>
</tr>
</tbody>
</table>

· Additional information: The lists that were valid during the creation were used as basis.

· Exposure controls
  · Personal protective equipment:
  · General protective and hygienic measures:
    Keep away from food and beverages.
    Immediately remove all soiled and contaminated clothing.
    Wash hands before breaks and at the end of work.
    Store protective clothing separately.
    Pregnant women should strictly avoid inhalation or skin contact.
  · Respiratory equipment:
    In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
  · Protection of hands:
    The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

  Protective gloves

  · Material of gloves Neoprene gloves
  · Penetration time of glove material Contact glove manufacture for break-through time.
  · Eye protection:

  Tightly sealed goggles
9 Physical and chemical properties

- Information on basic physical and chemical properties
  - General Information
    - Appearance:
      - Form: Liquid
      - Color: Colorless
    - Odor: Fruit-like
    - Odour threshold: Not determined.
  - pH-value at 20 °C (68 °F): 4
  - Change in condition
    - Melting point/Melting range: < -67 °C (< -89 °F)
    - Boiling point/Boiling range: 146 °C (295 °F)
  - Flash point: 46 °C (115 °F)
  - Flammability (solid, gaseous): Not applicable.
  - Ignition temperature: 315 °C (599 °F)
  - Decomposition temperature: Not determined.
  - Auto igniting: Not determined.
  - Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
  - Explosion limits:
    - Lower: 1.5 Vol %
    - Upper: 10.8 Vol %
  - Vapor pressure at 20 °C (68 °F): 3.7 hPa (3 mm Hg)
  - Density at 20 °C (68 °F): 0.96682 g/cm³ (8.068 lbs/gal)
  - Relative density: Not determined.
  - Vapour density: Not determined.
  - Evaporation rate: 1.6-2.3 (BuAc=1)
  - Solubility in / Miscibility with
    - Water at 20 °C (68 °F): 220 g/l
  - Partition coefficient (n-octanol/water): Not determined.
  - Viscosity:
    - Dynamic: Not determined.
    - Kinematic: Not determined.
  - Organic solvents: 100 %
  - VOC content: 100 %
  - Other information: No further relevant information available.

10 Stability and reactivity

- Reactivity
  - Chemical stability: Stable under normal use conditions
  - Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
  - Possibility of hazardous reactions: Possible formation of peroxide.
  - Conditions to avoid: Heat, flames and sparks. Extremes of temperature and direct sunlight.
  - Incompatible materials: Strong oxidizing agents
11 Toxicological information

11.1 Information on toxicological effects

11.1.1 Acute toxicity:

- LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Oral</th>
<th>Dermal</th>
<th>Inhalative</th>
</tr>
</thead>
<tbody>
<tr>
<td>108-65-6 1-Methoxy-2-propanol acetate</td>
<td>LD50 8532 mg/kg (Rat)</td>
<td>LD50 &gt;5000 mg/kg (Rat)</td>
<td>LC50/6 h 4345 ppm (Rat)</td>
</tr>
</tbody>
</table>

- Primary irritant effect:
  - on the skin: Irritant to skin and mucous membranes.
  - on the eye: Irritating effect.
  - Sensitization: No sensitizing effects known.
  - Experience with humans: No further relevant information available.
  - Additional toxicological information:

- Carcinogenic categories

  - IARC (International Agency for Research on Cancer)
    - Substance is not listed.
  - NTP (National Toxicology Program)
    - Substance is not listed.

12 Ecological information

- Toxicity

- Aquatic toxicity:

  108-65-6 1-Methoxy-2-propanol acetate

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>408-500 mg/l (daphnia magna)</td>
<td>100-180 mg/l (rainbow trout (Oncorhynchus mykiss))</td>
</tr>
</tbody>
</table>

- Persistence and degradability: No further relevant information available.
- Behavior in environmental systems:
  - Bioaccumulative potential: No further relevant information available.
  - Mobility in soil: No further relevant information available.
- Additional ecological information:
  - General notes:
    - Water hazard class 1 (Self-assessment): slightly hazardous for water
    - Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - Other adverse effects: No further relevant information available.
13 Disposal considerations

- Waste treatment methods
  - Recommendation:
    Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system. Disposal must be made in accordance with Federal, State, and Local regulations.

- Uncleaned packagings:
  - Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA UN3272

- UN proper shipping name
  - DOT, IMDG, IATA ESTERS, N.O.S. (1-Methoxy-2-propanol acetate)
  - ADR 3272 ESTERS, N.O.S. (1-Methoxy-2-propanol acetate)

- Transport hazard class(es)
  - DOT
    - Class 3 Flammable liquids.
    - Label 3
  
- ADR, IMDG, IATA
  - Class 3 Flammable liquids
    - Label 3

- Packing group
  - DOT, ADR, IMDG, IATA III

- Environmental hazards:
  - Marine pollutant: No

- Special precautions for user
  - Warning: Flammable liquids
  - Danger code (Kemler): 30
  - EMS Number: F-E,S-E

- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

- UN "Model Regulation": UN3272, ESTERS, N.O.S. (1-Methoxy-2-propanol acetate), 3, III
15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

- Section 355 (extremely hazardous substances):
  Substance is not listed.

- Section 313 (Specific toxic chemical listings):
  Substance is not listed.

- TSCA (Toxic Substances Control Act): All ingredients are listed or comply with TSCA regulations.

- Proposition 65

  - Chemicals known to cause cancer:
    Substance is not listed.

  - Chemicals known to cause reproductive toxicity for females:
    Substance is not listed.

  - Chemicals known to cause reproductive toxicity for males:
    Substance is not listed.

  - Chemicals known to cause developmental toxicity:
    Substance is not listed.

- Carcinogenic categories

  - EPA (Environmental Protection Agency)
    Substance is not listed.

  - TLV (Threshold Limit Value established by ACGIH)
    Substance is not listed.

  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    Substance is not listed.

  - OSHA-Ca (Occupational Safety & Health Administration)
    Substance is not listed.

- California SCAQMD Rule 443.1 VOC's: 960 g/l; vapor pressure 3.8 mm Hg @ 25C

- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).

  - Hazard pictograms

    | GHS02 | GHS08 |

- Signal word Danger

- Hazard-determining components of labeling:
  2-Methoxy-1-propyl acetate

- Hazard statements
  H226 Flammable liquid and vapor.
  H360 May damage fertility or the unborn child.

- Precautionary statements
  P210   Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P280   Wear protective gloves/protective clothing/eye protection/face protection.
  P201   Obtain special instructions before use.
Trade name: SU-8 Developer

P308+P313 IF exposed or concerned: Get medical advice/attention.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing MSDS: Product safety department

Contact: Mr. Cole

Revision History:
The business address of the manufacturer in Section 1 was updated. The hazard classification and precautionary statements for the mixture in Section 2 were revised. The toxicology data in Sections 11 and 12 were revised.

Date of preparation / last revision 12/15/2014 / -

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
SAFETY DATA SHEET

1. Identification

Product identifier: Sulfuric Acid

Other means of identification
Product No.: 9661, 3780, 9704, 9682, V648, V225, V186, V008, 6902, 2900, 2879, 2878, 2877, 2874, 6163, H996, H976, 5859, 2876, 5815, 5802, 9691, 9690, 9684, 9681, 9675, 9674, 9673, 9671, 5557, 5374, 21208, 21201

Recommended use and restriction on use
Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information

Manufacturer
Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
          Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax: Environmental Health & Safety
     info@avantormaterials.com
Contact Person: Environmental Health & Safety

Emergency telephone number:
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard Classification
Physical Hazards
Corrosive to metals Category 1

Health Hazards
Skin Corrosion/Irritation Category 1
Serious Eye Damage/Eye Irritation Category 1
Carcinogenicity Category 1A
Specific Target Organ Toxicity - Single Exposure Category 3

Environmental Hazards
Acute hazards to the aquatic environment Category 3

Label Elements
Hazard Symbol:

Signal Word: Danger
Hazard Statement: May be corrosive to metals. 
Causes severe skin burns and eye damage. 
May cause respiratory irritation. 
May cause cancer if inhaled. 
Harmful to aquatic life.

Precautionary Statement
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep only in original container. Wash thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response: IF exposed or concerned: Get medical advice/attention. Absorb spillage to prevent material damage. Immediately call a POISON CENTER or doctor/physician. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Storage: Store locked up. Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Substances

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td></td>
<td>7664-93-9</td>
<td>90 - 100%</td>
</tr>
</tbody>
</table>

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.
Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed
Symptoms: Corrosive to skin and eyes.

Indication of immediate medical attention and special treatment needed
Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:
Foam, carbon dioxide or dry powder.

Unsuitable extinguishing media:
Do not use water as an extinguisher.

Specific hazards arising from the chemical: Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:
Move containers from fire area if you can do so without risk. Fight fire from a protected location. Use water SPRAY only to cool containers! Do not put water on leaked material. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters:
Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:
Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up:
Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures:
Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.
Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash hands thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when adding this material to water. Add material slowly when mixing with water. Do not add water to the material; instead, add the material to the water. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Keep in a cool, well-ventilated place. Keep container tightly closed. Store in a dry place.

8. Exposure controls/personal protection

Control Parameters

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID - Thoracic fraction.</td>
<td>TWA</td>
<td>0.2 mg/m³</td>
<td>US. ACGIH Threshold Limit Values (2011)</td>
</tr>
<tr>
<td>SULFURIC ACID</td>
<td>REL</td>
<td>1 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>1 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>US. OSHA Table Z-T-A (29 CFR 1910.1000) (1999)</td>
</tr>
</tbody>
</table>

Appropriate Engineering Controls

No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties
Appearance

Physical state: Liquid
Form: Liquid
Color: Colorless
Odor: Odorless
Odor threshold: No data available.
pH: 0.3 (1 N aqueous solution)
Melting point/freezing point: 3 °C
Initial boiling point and boiling range: 337 °C
Flash Point: Not applicable
Evaporation rate: No data available.
Flammability (solid, gas): No data available.

Upper/lower limit on flammability or explosive limits
- Flammability limit - upper (%): No data available.
- Flammability limit - lower (%): No data available.
- Explosive limit - upper (%): No data available.
- Explosive limit - lower (%): No data available.

Vapor pressure: No data available.
Vapor density: No data available.
Relative density: 1.84 (20 °C)

Solubility(ies)
- Solubility in water: Miscible with water.
- Solubility (other): No data available.
Partition coefficient (n-octanol/water): No data available.
Auto-ignition temperature: No data available.
Decomposition temperature: No data available.
Viscosity: No data available.

10. Stability and reactivity

Reactivity: Reacts violently with strong alkaline substances.
Chemical Stability: Material is stable under normal conditions.
Possibility of Hazardous Reactions: Hazardous polymerization does not occur. Material reacts with water.
Hazardous Decomposition Products: Oxides of sulfur.

11. Toxicological information

Information on likely routes of exposure
- Ingestion: May cause burns of the gastrointestinal tract if swallowed.
- Inhalation: May cause damage to mucous membranes in nose, throat, lungs and bronchial system.
- Skin Contact: Causes severe skin burns.
- Eye contact: Causes serious eye damage.
Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

**Oral**
Product: No data available.

**Dermal**
Product: No data available.

**Inhalation**
Product: No data available.

Specified substance(s):
SULFURIC ACID
LC 50 (Guinea pig, 8 h): 0.03 mg/l
LC 50 (Rat, 4 h): 0.375 mg/l

**Repeated Dose Toxicity**
Product: No data available.

Skin Corrosion/Irritation
Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye damage.

Respiratory or Skin Sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
SULFURIC ACID Overall evaluation: 1. Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:
SULFURIC ACID Known To Be Human Carcinogen.

No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive Toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: Not classified
Other Effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Specified substance(s): SULFURIC ACID
LC 50 (Starry, european flounder (Platichthys flesus), 48 h): 100 - 330 mg/l Mortality
LC 50 (Western mosquito fish (Gambusia affinis), 96 h): 42 mg/l Mortality
LC 50 (Goldfish (Carassius auratus), 96 h): 17 mg/l Mortality

Aquatic Invertebrates
Specified substance(s): SULFURIC ACID
LC 50 (Common shrimp, sand shrimp (Crangon crangon), 48 h): 70 - 80 mg/l Mortality
LC 50 (Aesop shrimp (Pandalus montagui), 48 h): 42.5 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: There are no data on the degradability of this product.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in Soil: The product is water soluble and may spread in water systems.

Other Adverse Effects: The product contains a substance which is harmful to aquatic organisms. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.
Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT
UN Number: UN 1830
UN Proper Shipping Name: Sulfuric acid
Transport Hazard Class(es):
  Class(es): 8
  Label(s): 8
Packing Group: II
Marine Pollutant: No

IMDG
UN Number: UN 1830
UN Proper Shipping Name: SULPHURIC ACID (WITH MORE THAN 51% ACID)
Transport Hazard Class(es):
  Class(es): 8
  Label(s): 8
  EmS No.: F-A, S-B
Packing Group: II
Marine Pollutant: No

IATA
UN Number: UN 1830
Proper Shipping Name: Sulphuric acid
Transport Hazard Class(es):
  Class(es): 8
  Label(s): 8
Marine Pollutant: No
Packing Group: II

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):
SULFURIC ACID Reportable quantity: 1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

X Acute (Immediate) X Chronic (Delayed) Fire Reactive Pressure Generating

SARA 302 Extremely Hazardous Substance
Chemical Identity RQ Threshold Planning Quantity
SULFURIC ACID 1000 lbs. 1000 lbs.

SARA 304 Emergency Release Notification
Chemical Identity RQ
SULFURIC ACID 1000 lbs.
SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td>500lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Reporting threshold for other users</th>
<th>Reporting threshold for manufacturing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td>10000 lbs</td>
<td>25000 lbs.</td>
</tr>
</tbody>
</table>

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

SULFURIC ACID

Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

SULFURIC ACID

Threshold quantity: 10000 lbs

US State Regulations

US. California Proposition 65

SULFURIC ACID Carcinogenic.

US. New Jersey Worker and Community Right-to-Know Act

SULFURIC ACID Listed

US. Massachusetts RTK - Substance List

SULFURIC ACID Listed

US. Pennsylvania RTK - Hazardous Substances

SULFURIC ACID Listed

US. Rhode Island RTK

SULFURIC ACID Listed

Inventory Status:

Australia AICS: On or in compliance with the inventory
Canada DSL Inventory List: On or in compliance with the inventory
EU EINECS List: On or in compliance with the inventory
EU ELINCS List: Not in compliance with the inventory.
Japan (ENCS) List: On or in compliance with the inventory
EU No Longer Polymers List: Not in compliance with the inventory.
China Inv. Existing Chemical Substances: On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
Canada NDSL Inventory: Not in compliance with the inventory.
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Switzerland Consolidated Inventory: Not in compliance with the inventory.
Japan ISHL Listing: Not in compliance with the inventory.
Japan Pharmacopoeia Listing: Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>W</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

SDS_US - SDSMIX000168

9/10
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
W: Water-reactive

Issue Date: 02-02-2015
Revision Date: No data available.
Version #: 2.0
Further Information: No data available.

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