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SUBMITTED ELECTRONICALLY

Subject: 09-AFC-5C
Condition Number: Compliance 7
Description: Mojave Solar Project 2018 Annual Compliance Report
Submittal Number: COMPLIANCE7-02-00
Distribution: Keith Winstead, CEC; Kara Harris, US DOE; Wendy Campbell, CDFW; Ray Bransfield, USFWS; Thomas Dietsch, USFWS

2/28/2019

Keith Winstead, CPM
California Energy Commission
1516 Ninth Street
Sacramento, California 95814
keith.winstead@energy.ca.gov

Dear Mr. Winstead,

The attached Mojave Solar Project 2018 Annual Compliance Report (09-AFC-5C) is submitted for your review as part of the ongoing reporting required by the California Energy Commission’s Conditions of Certification for the Mojave Solar Project.

Sincerely,

Jose Manuel Bravo Romero
Manager
Compliance, Permitting, Quality and Environment Department

09-AFC-5C Mojave Solar Project
Annual Compliance Report
2018 reporting period

Prepared by:
Abengoa Solar Industrial Operations LLC.

for
Mojave Solar LLC
42134 Harper Lake Road
Hinkley, California 92347
Appendix K

2018 Hazardous Material List

Mojave Solar Project
Annual Compliance Report
San Bernardino County, California

2018 Reporting Period
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<th>Avg. Daily</th>
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<td>Steel Drum, Can, Fiber Drum, Plastic Bottle or Jug, Tote Bin, Tank, Wagon</td>
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### Hazardous Materials And Wastes Inventory Matrix Report

**Chemical Location**

Alpha and Beta plants

**CERS ID**

10453255

**Facility ID**

FA0014607

**Status**

Draft

### DOT Code/Fire Haz. Class

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**Printed on 2/22/2018 7:25 AM**

**Page 5 of 25**
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<tr>
<th>DOT Code/Fire Haz. Class</th>
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<th>Unit</th>
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<th>Federal Hazard Categories</th>
<th>Component Name</th>
<th>% WT</th>
<th>EHS</th>
<th>CAS No.</th>
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<td>Cu. Feet</td>
<td>2400</td>
<td>50</td>
<td>- Pressure Release</td>
<td>- Acute Health</td>
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<td>Carbon Dioxide</td>
<td>Cu. Feet</td>
<td>6272</td>
<td>480</td>
<td>- Pressure Release</td>
<td>- Acute Health</td>
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### Hazardous Materials And Wastes Inventory Matrix Report

**CERS Business/Org.:** Mojave Solar LLC  
**CERS ID:** 10453255  
**Facility ID:** FA0014607  
**Facility Name:** Mojave Solar LLC  
**Chemical Location:** Alpha and Beta plants  
**Status:** Draft  
**Printed on:** 2/22/2018 7:25 AM  
**Page:** 7 of 25

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<th>Common Name</th>
<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
<th>Component Name</th>
<th>% Wt</th>
<th>CAS No.</th>
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<tr>
<td><strong>Irritant</strong></td>
<td>Citric Acid, Anhydrous</td>
<td>Pounds</td>
<td>9420</td>
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<td>Diesel Fuel</td>
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<td>EDTA, TETRASODIUM</td>
<td>Pounds</td>
<td>600</td>
<td>Max. Daily: 350</td>
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<td>Ferric Chloride, Anhydrous</td>
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<td><strong>Flammable and Combustible Liquids</strong></td>
<td>Galvanizing Compound</td>
<td>Pounds</td>
<td>15</td>
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<td>Zinc</td>
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**Chemical Location:** Alpha and Beta plants  
**Facility ID:** FA0014607  
**Facility Name:** Mojave Solar LLC  
**42134 Harper Lake Rd, Hinkley 92347**
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<tr>
<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
<th>Component Name</th>
<th>Hazardous Components (For mixture only)</th>
<th>% Wt</th>
<th>CAS No.</th>
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</thead>
<tbody>
<tr>
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<td>Hydrochloric Acid</td>
<td>Gallons</td>
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<td>Corrosive, Other Health Hazard</td>
<td>Hydrogen</td>
<td>Cu. Feet</td>
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<td>1800</td>
<td>- Fire</td>
<td>Hydrogen Gas</td>
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<td>Hydrogen</td>
<td>Cu. Feet</td>
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<td>13000</td>
<td>- Pressure Release</td>
<td>Oxygen Gas</td>
<td>100%</td>
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<td>7782-44-7</td>
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<tr>
<td>DOT: 2.2 - Nonflammable Gases</td>
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<td>Cu. Feet</td>
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<td>18000</td>
<td>- Pressure Release</td>
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<td>100%</td>
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<td>Organic Acid Terpolymer</td>
<td>Gallons</td>
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<td>500</td>
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<td>DOT: 2.2 - Nonflammable Gases</td>
<td>Antiscalant V4000</td>
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**Hazardous Materials And Wastes Inventory Matrix Report**

**CERS Business/Org.:** Mojave Solar LLC  
**CERS ID:** 10453255  
**Facility Name:** Mojave Solar LLC  
**Facility ID:** FA0014607  
**Chemical Location:** Alpha and Beta plants  
**Status:** Draft

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<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Chemical Location</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
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<tbody>
<tr>
<td>DOT: 4.1 - Flammable Solids</td>
<td>Silicon</td>
<td>Gallons</td>
<td>36.7</td>
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<td>Pressure</td>
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<td>Component Name</td>
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<td>Ambient</td>
<td>Temperature</td>
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<td>Water</td>
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<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Sodium Hydroxide Solid</td>
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<td>500</td>
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<td>Days on Site: 365</td>
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<td>Tank Inside Building</td>
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<td>Temperature</td>
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<td>Sodium Nitrite</td>
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## Hazardous Materials And Wastes Inventory Matrix Report

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<th>Unit</th>
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<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
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<tbody>
<tr>
<td>Combustible Liquid, Class III-B, Irritant</td>
<td>Surfonic Surfactant NP95</td>
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<td>Aboveground Tank, Other</td>
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Printed on 2/22/2018 7:25 AM
# Hazardous Materials And Wastes Inventory Matrix Report

**CERS ID**: 10453255  
**CERS Business/Org.**: Mojave Solar LLC  
**Facility Name**: Mojave Solar LLC  
**Facility ID**: FA0014607  
**Status**: Draft

## Chemical Location

**Alpha and Beta power blocks**

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<th>DOT Code/Fire Haz. Class</th>
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<th>Unit</th>
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<th>Federal Hazard Categories</th>
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<td>Fyrquel EHC Plus</td>
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<td>Gasoline</td>
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## Hazardous Components

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<td>Urea</td>
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<td>t-butylphenyl diphenyl phosphate</td>
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<td>BIS-BUTYLPHENYL Phosphate</td>
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<td>tri-butylphenyl Phosphate</td>
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<td>triphenyl phosphate</td>
<td>4 %</td>
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<td>Unleaded Gasoline</td>
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<td>Glycerin</td>
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<td>Polyphosphoric acids, sodium salts and Sodium hydroxide</td>
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<td>Industrial oil (gear lubricant)</td>
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<td>Gallons</td>
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<td>Motor oil</td>
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<td>Gallons</td>
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<td>Motor oil, Engine Oil</td>
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### Flammable Gas

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<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
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</table>
| Propylene              | Cu. Feet    |     | 450        | 50  
|                         |             |     | Max. Daily | Largest Cont.  
|                         |             |     | Avg. Daily | Waste Code  
|                         |             |     |            | Fire  
|                         |             |     |            | Pressure Release  
|                         |             |     |            | Health Hazard  
|                         |             |     |            | Not Otherwise Classified  |
|                         |             |     |            | Propane  
|                         |             |     |            | 100 %  
|                         |             |     |            | CAS No.  
<p>|                         | Pure        | Cu. Feet | 365 |
|                         | Pure        | Days on Site | 365 |
|                         | Pure        | Gas State | Liquid |
|                         | Pure        | Gas | Cylinder |
|                         | Pure        | Type | |</p>
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<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
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<td>Solid hazardous waste</td>
<td>Pounds</td>
<td>115</td>
<td>20</td>
<td>42000</td>
<td>Discarded batteries, contaminated chemical containers, scrap metal, oily rags, used oil absorbent material, oil filters, contaminated soil with oil or diesel, used activated carbon, used fluorescent bulbs, broken glass or mirrors, filter-press solids</td>
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<td></td>
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<td></td>
<td>Steel Drum, Can, Fiber Drum, Plastic Bottle or Jug, Tote Bin, Tank, Wagon</td>
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<td>Days on Site: 365</td>
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</table>
### Hazardous Materials And Wastes Inventory Matrix Report

**CERS Business/Org.**  
Mojave Solar LLC

**Facility Name**  
Mojave Solar LLC

**Facility ID**  
FA0014607

**CERS ID**  
10453255

**Facility Name**  
Mojave Solar LLC

**42134 Harper Lake Rd, Hinkley 92347**

**Chemical Location**  
Alpha and Beta solid waste. Located in Beta plant.

**Status**  
Draft

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<tr>
<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
<th>Component Name</th>
<th>Hazardous Components (For mixture only)</th>
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<td>Solid hazardous waste</td>
<td>Pounds</td>
<td>49</td>
<td>20</td>
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<td>Spent chemicals, used hydraulic fluid, oil, and grease, effluent from oil water separator, used glycerin, oily water from the cooling tower</td>
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<td>State</td>
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<td>Liquid</td>
<td>Steel Drum, Can, Fiber Drum, Plastic Bottle or Jug, Tote Bin, Tank</td>
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<td>Type</td>
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<tr>
<td></td>
<td></td>
<td>Mixture</td>
<td>Days on Site: 365</td>
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**CAS No.**

Spent chemicals, used hydraulic fluid, oil, and grease, effluent from oil water separator, used glycerin, oily water from the cooling tower
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<th>DOT Code/Fire Haz. Class</th>
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<th>Unit</th>
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<td>Mineral oil</td>
<td>Gallons</td>
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- **Chemical Identity:**
  - **CAS No:** 8042-47-5
  - **Common Name:** Mineral oil

- **Physical State:**
  - **State:** Liquid
  - **Type:** Storage Container

- **Container Details:**
  - **Type:** Liquid
  - **Storage Container:** Steel Drum

- **Disposal Details:**
  - **Temperature:**
  - **Days on Site:** 365

- **Specifications:**
  - **DOT Code/Fire Haz. Class:**
  - **Component Name:**
  - **% Wt:**
  - **EHS:**
  - **CAS No.:**
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<th>Hazardous Components (For mixture only)</th>
<th>Chemical Location</th>
<th>Hazardous Components (For mixture only)</th>
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<tbody>
<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Ammonia</td>
<td>Gallons 660</td>
<td>Aqueous Ammonia</td>
<td>13 %</td>
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<td>Irritant</td>
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<td>Grid: E5, H9</td>
<td>State</td>
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<tr>
<td>Type</td>
<td>Mixture</td>
<td>Days on Site: 365</td>
<td>450</td>
<td>Chronic health</td>
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<td>DOT: 2.2 - Nonflammable Gases</td>
<td>Carbon Dioxide, Liquid</td>
<td>Gallons 26000</td>
<td>- Pressure Release</td>
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<td>Cryogen, Other Health Hazard, Irritant</td>
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<td>High Calcium Hydrated Lime</td>
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<td>Magnesium Sulfate</td>
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<td>DOT: 9 - Misc. Hazardous Materials</td>
<td>Sodium Bisulfite</td>
<td>Gallons 1456</td>
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<tr>
<td>Unstable (Reactive), Class 3</td>
<td>CAS No</td>
<td>007631-90-5</td>
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<td>Type</td>
<td>Mixture</td>
<td>Days on Site: 365</td>
<td>450</td>
<td>Health Skin</td>
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<td>DOT: 9 - Misc. Hazardous Materials</td>
<td>Sodium Bisulfite</td>
<td>Gallons 660</td>
<td>Sodium Bisulfite</td>
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<tr>
<td>Unstable (Reactive), Class 3</td>
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<td>Mixture</td>
<td>Days on Site: 365</td>
<td>450</td>
<td>Health Skin</td>
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</table>
## Hazardous Materials And Wastes Inventory Matrix Report

**CERS Business/Org.**: Mojave Solar LLC  
**Facility Name**: Mojave Solar LLC  
**Chemical Location**: Alpha and Beta water treatment plants  
**CERS ID**: 10453255  
**Facility ID**: FA0014607  
**Status**: Draft

### DOT Code/Fire Haz. Class

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### Hazardous Components

**CAS No:** 7681-52-9  
**Map:** L003 and L004  
**Grid:** C32 a, D32 b  
**CAS No:** 7681-52-9  
**Map:** F5, H9  
**Grid:** C32 a, D32 b  
**CAS No:** 7681-52-9  
**Map:** F5, H9  
**Grid:** C32 a, D32 b

### DOT: 9 - Misc. Hazardous Materials

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<tbody>
<tr>
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<td>Tank Inside Building</td>
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### DOT: 9 - Misc. Hazardous Materials

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<th>State</th>
<th>Liquid</th>
<th>Type</th>
<th>Storage Container</th>
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<th>Pressure</th>
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**Printed on 2/22/2018 7:25 AM**  
**Page 19 of 25**
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<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Max. Daily</th>
<th>Largest Cont.</th>
<th>Avg. Daily</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
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<tbody>
<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Sulfuric Acid 50-91%</td>
<td>Pounds</td>
<td>500</td>
<td>300</td>
<td>Waste Code 791</td>
<td>- Reactive</td>
<td>Sulfuric Acid 96 % 7664-93-9</td>
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<td>Corrosive, Water Reactive, Class 1, Toxic</td>
<td>CAS No. 7664-93-9</td>
<td>Liquid State Storage Container Tank Inside Building Type</td>
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<td>- Acute Health - Chronic health - Physical Flammable - Physical Corrosive To Metal - Health Acute Toxicity - Health Reproductive Toxicity - Health Skin Corrosion Irritation - Health Respiratory Skin Sensitization - Health Aspiration Hazard</td>
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### Hazardous Materials And Wastes Inventory Matrix Report

#### Chemical Location
**Alpha and Beta Water Treatment Plants**

#### CERS Business/Org.
**Mojave Solar LLC**

#### Facility Name
**Mojave Solar LLC**

**42134 Harper Lake Rd, Hinkley 92347**

#### CERS ID
**10453255**

#### Facility ID
**FA0014607**

#### Status
**Draft**

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<th>CAS No.</th>
<th>Common Name</th>
<th>CAS No.</th>
<th>Component Name</th>
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<td>Ferric Chloride</td>
<td>7705-08-0</td>
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<td>660</td>
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<td>Liquid Carbon Dioxide</td>
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<td>CAS No.</td>
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<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Soda Ash</td>
<td>16482-55-6</td>
<td>Pounds</td>
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<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Sodium Hydroxide</td>
<td>1310-73-2</td>
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<td>1056</td>
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<tr>
<td>DOT Code/Fire Haz. Class</td>
<td>Common Name</td>
<td>Unit</td>
<td>Quantities</td>
<td>Annual Waste Amount</td>
<td>Federal Hazard Categories</td>
<td>Hazardous Components (For mixture only)</td>
</tr>
<tr>
<td>-------------------------</td>
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<tr>
<td>DOT: 9 - Misc. Hazardous Materials Corrosive</td>
<td>Sodium Hydroxide</td>
<td>Gallons</td>
<td>1056</td>
<td>528</td>
<td>- Reactive</td>
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<td>State Liquid</td>
<td>Storage Container</td>
<td>Tote Bin</td>
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<td>Pressure Ambient</td>
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<td>Type Mixture</td>
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<td>Temperature Ambient</td>
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<tr>
<td>DOT: 9 - Misc. Hazardous Materials Corrosive</td>
<td>Sodium Hydroxide</td>
<td>Gallons</td>
<td>990</td>
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<td>- Reactive</td>
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<td>State Liquid</td>
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<td>Tote Bin</td>
<td>Days on Site: 365</td>
<td>Pressure Ambient</td>
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<td></td>
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<td>Type Mixture</td>
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<td></td>
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<td>Temperature Ambient</td>
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<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids) Irritant, Toxic</td>
<td>Sulfuric Acid</td>
<td>Gallons</td>
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<td>Days on Site: 365</td>
<td>Pressure Ambient</td>
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<td>Temperature Ambient</td>
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**CERS ID**: 10453255
**Facility ID**: FA0014607
**Status**: Draft

Printed on 2/22/2018 7:25 AM
### Hazardous Materials And Wastes Inventory Matrix Report

**Chemical Location**: Alpha and Beta Water Treatment Plants

<table>
<thead>
<tr>
<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
<th>Federal Hazard Categories</th>
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<tbody>
<tr>
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<td>Gallons</td>
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<td>660</td>
<td>330</td>
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<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Sulfuric Acid</td>
<td>Gallons</td>
<td>660</td>
<td>330</td>
<td>Reactive</td>
</tr>
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<td>Storage Container</td>
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<td>Pressure</td>
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<td>Liquid</td>
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<td>Type</td>
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</table>

**CERS Business/Org.**: Mojave Solar LLC

**Facility Name**: Mojave Solar LLC

**Address**: 42134 Harper Lake Rd, Hinkley 92347

**CERS ID**: 10453255

**Facility ID**: FA0014607

**Status**: Draft
<table>
<thead>
<tr>
<th>DOT Code/Fire Haz. Class</th>
<th>Common Name</th>
<th>Unit</th>
<th>Quantities</th>
<th>Annual Waste Amount</th>
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<tbody>
<tr>
<td>DOT: 8 - Corrosives (Liquids and Solids)</td>
<td>Sulfuric Acid 50-91%</td>
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<td>Corrosive, Water Reactive, Class 1, Toxic</td>
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<table>
<thead>
<tr>
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<th>Liquid Type</th>
<th>Storage Container</th>
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<tbody>
<tr>
<td>Liquid</td>
<td>Mixture</td>
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<tr>
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<tr>
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<th>Component Name</th>
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<th>CAS No.</th>
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<tr>
<td>791</td>
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<td>7644-93-9</td>
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<table>
<thead>
<tr>
<th>Federal Hazard Categories</th>
<th>Hazardous Components (For mixture only)</th>
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<tbody>
<tr>
<td>- Reactive</td>
<td>Sulfuric Acid</td>
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<tr>
<td>- Acute Health</td>
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<tr>
<td>- Chronic health</td>
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<tr>
<td>- Physical Flammable</td>
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<td>- Physical Corrosive To Metal</td>
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<tr>
<td>- Health Acute Toxicity</td>
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<tr>
<td>- Health Reproductive Toxicity</td>
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<tr>
<td>- Health Skin Corrosion Irritation</td>
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<td>- Health Respiratory Skin Sensitization</td>
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<tr>
<td>- Health Aspiration Hazard</td>
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<tr>
<td>DOT Code/Fire Haz. Class</td>
<td>Common Name</td>
</tr>
<tr>
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<tr>
<td>DOT: 3 - Flammable and Combustible Liquids</td>
<td>Gasoline</td>
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<td>Flammable Liquid, Class I-A</td>
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**Chemical Location**: Alpha plant only

**CERS ID**: 10453255

**Facility ID**: FA0014607

**Status**: Draft

**CERS Business/Org.**: Mojave Solar LLC

**Facility Name**: Mojave Solar LLC

**Address**: 42134 Harper Lake Rd, Hinkley 92347
SAFETY DATA SHEET
BETZ*DEARBORN DCL30

1. Identification

Product identifier BETZDEARBORN DCL30
Other means of identification None.
Recommended use Dechlorination agent
Recommended restrictions None known.

Company/undertaking identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA  19053
T 215 355 3300, F 215 953 5524

Emergency telephone
(800) 877 1940

2. Hazard(s) identification

Physical hazards Not classified.
Health hazards Serious eye damage/eye irritation Category 2B
Specific target organ toxicity, single exposure Category 3 respiratory tract irritation

OSHA defined hazards Not classified.

Label elements

Signal word Warning
Hazard statement Causes eye irritation. May cause respiratory irritation.

Precautionary statement
Prevention Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.
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. Call a poison center/doctor/ if you feel unwell. If eye irritation persists: Get medical advice/attention.
Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container to.

Hazard(s) not otherwise classified (HNOC) None known.
Supplemental information None.

3. Composition/information on ingredients

Mixtures
Components | CAS # | Percent
--- | --- | ---
Sodium bisulphite | 7631-90-5 | 20 - 40

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

**4. First-aid measures**

**Inhalation**

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

**Skin contact**

Rinse skin with water/shower.

**Eye contact**

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

**Ingestion**

Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.

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

Exposed individuals may experience eye tearing, redness, and discomfort. Irritation of eyes and mucous membranes. May cause respiratory irritation. Skin irritation.

**Indication of immediate medical attention and special treatment needed**

Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

**General information**

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

**5. Fire-fighting measures**

**Suitable extinguishing media**

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

**Unsuitable extinguishing media**

Water. Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical**

During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters**

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

**Fire fighting equipment/instructions**

In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

**Specific methods**

Use standard firefighting procedures and consider the hazards of other involved materials.

**General fire hazards**

No unusual fire or explosion hazards noted.

**6. Accidental release measures**

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

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors or mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

**Environmental precautions**

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

**7. Handling and storage**

**Precautions for safe handling**

Vent carefully before opening. Sulfur dioxide can be formed during the normal use and handling of this product. Avoid breathing mist or vapor. Avoid contact with eyes. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
Conditions for safe storage, including any incompatibilities
Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation. Avoid freezing. If frozen, thaw completely and mix thoroughly prior to use.

8. Exposure controls/personal protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>US. ACGIH Threshold Limit Values</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
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<tr>
<td>Sodium bisulphite (CAS 7631-90-5)</td>
<td>TWA</td>
<td>5 mg/m3</td>
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</table>

<table>
<thead>
<tr>
<th>US. NIOSH: Pocket Guide to Chemical Hazards Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium bisulphite (CAS 7631-90-5)</td>
<td>TWA</td>
<td>5 mg/m3</td>
</tr>
</tbody>
</table>

Biological limit values
No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls
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. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection
Chemical goggles are recommended.

Skin protection
Hand protection
Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Other
Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
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.

9. Physical and chemical properties

Appearance

<table>
<thead>
<tr>
<th>Color</th>
<th>Colorless to light yellow</th>
</tr>
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<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
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<tr>
<td>Odor</td>
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<tr>
<td>Odor threshold</td>
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<tr>
<td>pH (concentrated product)</td>
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<tr>
<td>pH in aqueous solution</td>
<td>4.9 (5% SOL.)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>18 °F (-8 °C)</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>220 °F (104 °C)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1 (Ether = 1)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.
Flammability limit - upper (%) Not available.
Explosive limit - lower (%) Not available.
Explosive limit - upper (%) Not available.
Vapor pressure
18 mm Hg
Vapor pressure temp. 70 °F (21 °C)
Vapor density < 1 (Air = 1)
Relative density 1.27
Relative density temperature 70 °F (21 °C)
Solubility
   Solubility (water) 100 %
Partition coefficient (n-octanol/water) Not available.
Auto-ignition temperature Not available.
Decomposition temperature Not available.
Viscosity 6 cps
Viscosity temperature 70 °F (21 °C)
Other information
   Percent volatile 0 (Calculated)
   Pour point 23 °F (-5 °C)
   Specific gravity 1.27

10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability Material is stable under normal conditions.
Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.
Conditions to avoid Contact with incompatible materials. None under normal conditions.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition products Oxides of sulphur evolved in fire.

11. Toxicological information
Information on likely routes of exposure
   Inhalation May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
   Skin contact No adverse effects due to skin contact are expected.
   Eye contact Causes eye irritation.
   Ingestion Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics
   Irritation of eyes and mucous membranes. Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation. Skin irritation.
Information on toxicological effects
Acute toxicity May cause respiratory irritation.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETZ*DEARBORN DCL30 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 5000 mg/kg, (Calculated according to GHS additivity formula)</td>
</tr>
<tr>
<td>Inhalation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Rat</td>
<td>&gt; 5 mg/l, 4 hours, (Calculated according to GHS additivity formula)</td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rat</td>
<td>3320 mg/kg, (Calculated according to GHS additivity formula)</td>
</tr>
</tbody>
</table>
Components | Species | Test Results
--- | --- | ---
Sodium bisulphite (CAS 7631-90-5)

**Acute**

**Dermal**
LD50 | Rabbit | > 2000 mg/kg

**Inhalation**
LC50 | Rat | > 5.5 mg/l, 4 Hour

**Oral**
LD50 | Rat | 1420 mg/kg

* Estimates for product may be based on additional component data not shown.

**Skin corrosion/irritation**
Prolonged skin contact may cause temporary irritation.

**Serious eye damage/eye irritation**
Causes eye irritation.

**Respiratory or skin sensitization**

**Respiratory sensitization**
Not available.

**Skin sensitization**
This product is not expected to cause skin sensitization.

**Germ cell mutagenicity**
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity**
This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity
Sodium bisulphite (CAS 7631-90-5) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens
Not available.

**Reproductive toxicity**
This product is not expected to cause reproductive or developmental effects.

**Specific target organ toxicity - single exposure**
May cause respiratory irritation.

**Specific target organ toxicity - repeated exposure**
Not available.

**Aspiration hazard**
Not available.

**Chronic effects**
Prolonged inhalation may be harmful.

12. Ecological information

**Ecotoxicity**

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETZDEARBORN DCL30 (CAS Mixture)</td>
<td>Fathead Minnow</td>
<td>225 mg/L, Static Renewal Bioassay, 96 hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Menidia beryllina (Silversides)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mysid Shrimp</td>
</tr>
<tr>
<td>NOEL</td>
<td>Fathead Minnow</td>
<td>160 mg/L, Static Renewal Bioassay, 96 hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Menidia beryllina (Silversides)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mysid Shrimp</td>
</tr>
<tr>
<td>Aquatic</td>
<td>Crustacea</td>
<td>LC50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOEL</td>
</tr>
</tbody>
</table>
### Product Test Results

<table>
<thead>
<tr>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish 100 mg/L</td>
<td>0% Mortality, Rainbow Trout, Static Screen, 48 hour</td>
</tr>
<tr>
<td>Fish 500 mg/L</td>
<td>100% Mortality, Rainbow Trout, Static Screen, 48 hour</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

### Bioaccumulative potential
- No data available.

### Mobility in soil
- No data available.

### Other adverse effects
- Not available.

### Persistence and degradability
- COD (mgO2/g) 49 (calculated data)

### 13. Disposal considerations

#### Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

#### Local disposal regulations
Dispose in accordance with all applicable regulations.

#### Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

#### Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

#### Contaminated packaging
Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

#### DOT
- **UN number**: UN3082
- **UN proper shipping name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. (SODIUM BISULFITE SOLUTION), RQ
- **Class**: 9
- **Subsidiary risk**: -
- **Packing group**: III
- **Special precautions for user**: Read safety instructions, SDS and emergency procedures before handling.
- **ERG number**: 171

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA
Not regulated as dangerous goods.

#### IMDG
- **UN number**: UN3082
- **UN proper shipping name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. (SODIUM BISULFITE SOLUTION), RQ
- **Class**: 8
- **Subsidiary risk**: -
- **Packing group**: III
- **Environmental hazards**: No.
- **Marine pollutant**: No.
- **EmS**: Not available.
- **Special precautions for user**: Read safety instructions, SDS and emergency procedures before handling.
15. Regulatory information

US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
Sodium bisulphite (CAS 7631-90-5) Listed.

SARA 304 Emergency release notification
Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312 Hazardous chemical
No

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
</tbody>
</table>

Material name: BETZ*DEARBORN DCL30
Version number: 1.0
<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**NSF Registered and/or meets USDA (according to 1998 guidelines):**

Registration No. – 147820
Category Codes:
G5 Cooling and retort water treatment products
G6 Boiler treatment products, steam line products – food contact

**US state regulations**

**US - Massachusetts RTK - Substance List**
Sodium bisulphite (CAS 7631-90-5)

**US - Pennsylvania RTK - Hazardous Substances**
Sodium bisulphite (CAS 7631-90-5)

**US - Rhode Island RTK**
Sodium bisulphite (CAS 7631-90-5)

**US, California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**
Not listed.

**US, New Jersey Worker and Community Right-to-Know Act**
Sodium bisulphite (CAS 7631-90-5)

**US, Pennsylvania Worker and Community Right-to-Know Law**
Sodium bisulphite (CAS 7631-90-5)

**US, California Proposition 65**
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**
No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**
No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**
No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**
No ingredient listed.

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

**Issue date**
Oct-16-2014

**Revision date**
Aug-03-2015

**Version #**
1.0

**List of abbreviations**
CAS: Chemical Abstract Service Registration Number
TWA: Time Weighted Average
STEL: Short Term Exposure Limit
LD50: Lethal Dose, 50%
LC50: Lethal Concentration, 50%
EC50: Effect Concentration, 50%
NOEL: No Observed Effect Level
COD: Chemical Oxygen Demand
BOD: Biochemical Oxygen Demand
TOC: Total Organic Carbon
CEN: European Committee for Standardisation
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods Code
NFPA: National Fire Protection Association
ACGIH: American Conference of Governmental Industrial Hygienists
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:**
No data available
Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Information

Hazard(s) identification: Hazard statement
Hazard(s) identification: Prevention
Composition/information on ingredients: Composition comments
First-aid measures: Skin contact
First-aid measures: Most important symptoms/effects, acute and delayed
Handling and storage: Precautions for safe handling
Physical & Chemical Properties: Multiple Properties
Toxicological Information: Toxicological Data
Toxicological information: Reproductive toxicity
Toxicological information: Inhalation
Toxicological information: Symptoms related to the physical, chemical and toxicological characteristics
Other information, including date of preparation or last revision: Prepared by
GHS: Classification

Prepared by

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

* Trademark of General Electric Company. May be registered in one or more countries.
SAFETY DATA SHEET

OPTISPERSE* HP3100

1. Identification

Product identifier
OPTISPERSE HP3100

Other means of identification
None.

Recommended use
Water based internal boiler treatment chemical.

Recommended restrictions
None known.

Company/undertaking identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone
(800) 877 1940

2. Hazard(s) identification

Physical hazards

Health hazards
Skin corrosion/irritation
Serious eye damage/eye irritation
Specific target organ toxicity, single exposure

Category 1A
Category 1
Category 3 respiratory tract irritation

OSHA defined hazards
Not classified.

Label elements

Signal word
Danger

Hazard statement
Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.

Precautionary statement

Prevention
Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response
If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. 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. Immediately call a poison center/doctor. Wash contaminated clothing before reuse.

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

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)
None known.

Supplemental information
None.
3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyphosphoric acids, sodium salts</td>
<td>68915-31-1</td>
<td>2.5 - 10</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>1310-73-2</td>
<td>2.5 - 10</td>
</tr>
</tbody>
</table>

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

Composition comments

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. For breathing difficulties, oxygen may be necessary. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn’t get into the lungs. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Corrosive effects. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. If you feel unwell, seek medical advice (show the label where possible).

5. Fire-fighting measures

Suitable extinguishing media

Water fog. Carbon dioxide (CO2).

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions

In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards

No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment and clothing during clean-up. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up
Ventilate the area. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Flush with plenty of water.

Large Spills: Stop the flow of material, if this is without risk. Diike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions
Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

7. Handling and storage
Precautions for safe handling
Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage. Do not mix with acidic material.

Conditions for safe storage, including any incompatibilities
Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation. Avoid freezing. If frozen, thaw completely and mix thoroughly prior to use.

8. Exposure controls/personal protection
Occupational exposure limits

<table>
<thead>
<tr>
<th>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Sodium hydroxide (CAS 1310-73-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US. ACGIH Threshold Limit Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Sodium hydroxide (CAS 1310-73-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US. NIOSH: Pocket Guide to Chemical Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Sodium hydroxide (CAS 1310-73-2)</td>
</tr>
</tbody>
</table>

Biological limit values
No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls
Eye wash facilities and emergency shower must be available when handling this product. 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.

Individual protection measures, such as personal protective equipment
Eye/face protection
Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection
Hand protection
The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Suitable gloves can be recommended by the glove supplier. Glove selection must take into account any solvents and other hazards present.

Other
Wear appropriate chemical resistant clothing. Chemical resistant apron.

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. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA’S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR’S USE.

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
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.

9. Physical and chemical properties
Appearance
Color
Colorless to light yellow
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH (concentrated product)</td>
<td>&gt; 13</td>
</tr>
<tr>
<td>pH in aqueous solution</td>
<td>12.4 (5% SOL.)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>21 °F (-6 °C)</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>210 °F (99 °C)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1 (Ether = 1)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td>Flammability limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosive limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>18 mm Hg</td>
</tr>
<tr>
<td>Vapor pressure temp.</td>
<td>70 °F (21 °C)</td>
</tr>
<tr>
<td>Vapor density</td>
<td>&lt; 1 (Air = 1)</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.11</td>
</tr>
<tr>
<td>Relative density temperature</td>
<td>70 °F (21 °C)</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Solubility (water)</td>
<td>100 %</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>5 cps</td>
</tr>
<tr>
<td>Viscosity temperature</td>
<td>70 °F (21 °C)</td>
</tr>
<tr>
<td>Other information</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not oxidizing</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>0 (Calculated)</td>
</tr>
<tr>
<td>Pour point</td>
<td>26 °F (-3 °C)</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.11</td>
</tr>
<tr>
<td>10. Stability and reactivity</td>
<td>The product is stable and non-reactive under normal conditions of use, storage and transport.</td>
</tr>
<tr>
<td>Reactivity</td>
<td>Material is stable under normal conditions.</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>Hazardous polymerization does not occur.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Contact with incompatible materials. None under normal conditions. Protect from freezing.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Strong acids. Strong oxidizing agents.</td>
</tr>
<tr>
<td>Incompatible materials</td>
<td>Oxides of carbon, nitrogen, phosphorus, and sulphur evolved in fire.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td></td>
</tr>
<tr>
<td>11. Toxicological information</td>
<td></td>
</tr>
<tr>
<td>Information on likely routes of exposure</td>
<td></td>
</tr>
<tr>
<td>Inhalation</td>
<td>May cause irritation to the respiratory system. Prolonged inhalation may be harmful. Inhalation of vapors/mists/aerosols may cause eye, nose, throat and lung irritation.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>Causes severe skin burns.</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Causes serious eye damage.</td>
</tr>
</tbody>
</table>

Material name: OPTISPERSE* HP3100
Version number: 2.0
Ingestion may cause severe irritation of the mouth, the esophagus and the gastrointestinal tract.

Symptoms related to the physical, chemical and toxicological characteristics

Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Symptoms on skin may develop from redness and itching with development to burns due to corrosion. Symptoms on eyes may develop from tearing with development into severe irritation and/or burns due to corrosion. Permanent eye damage including blindness could result. Symptoms on ingestion may develop from discomfort with development into severe irritation and/or burns due to corrosion.

Information on toxicological effects

Acute toxicity

May cause respiratory irritation.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTISPERSE HP3100 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50</td>
<td>Rabbit</td>
<td>&gt; 5000 mg/kg, (Calculated according to GHS additivity formula)</td>
</tr>
<tr>
<td>Oral LD50</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg, (Calculated according to GHS additivity formula)</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation

Causes skin burns.

Serious eye damage/eye irritation

Causes severe eye burns.

Respiratory or skin sensitization

Respiratory sensitization

This product is not expected to cause respiratory sensitization.

Skin sensitization

This product is not expected to cause skin sensitization.

Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity

Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not available.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

Reproductive toxicity

This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

Not classified.

Aspiration hazard

Based on available data, the classification criteria are not met. Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.

Chronic effects

Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTISPERSE HP3100 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Fathead Minnow</td>
<td>5020 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)</td>
</tr>
<tr>
<td>NOEL</td>
<td>Fathead Minnow</td>
<td>2750 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)</td>
</tr>
<tr>
<td>Aquatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea LC50</td>
<td>Daphnia magna</td>
<td>3300 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)</td>
</tr>
<tr>
<td>Product</td>
<td>Species</td>
<td>Test Results</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NOEL</td>
<td>Daphnia magna</td>
<td>1250 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

**Bioaccumulative potential**

No data available.

**Mobility in soil**

No data available.

**Other adverse effects**

Not available.

**Persistence and degradability**

- COD (mgO₂/g)

No information available.

### 13. Disposal considerations

**Disposal instructions**

Dispose of contents/container in accordance with local/regional/national/international regulations. Via an authorized waste disposal contractor to an approved waste disposal site, observing all local and national regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water. The waste generator is responsible to determine the hazard information and physicochemical properties of the material/product generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator.

**Local disposal regulations**

Dispose in accordance with all applicable regulations.

**Hazardous waste code**

D002: Waste Corrosive material ([pH <=2 or =>12.5, or corrosive to steel])

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products**

Avoid discharge into water courses or onto the ground. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging**

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied. Depending on the origin and state of the waste, other EWC numbers may be applicable too.

### 14. Transport information

**DOT**

- **UN number**: UN3266
- **UN proper shipping name**: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE, SODIUM PHOSPHATES), RQ (SODIUM HYDROXIDE)
- **Transport hazard classes**
  - **Class**: 8
  - **Subsidiary risk**: -
  - **Packing group**: II
- **Special precautions for user**: Read safety instructions, SDS and emergency procedures before handling.
- **ERG number**: 154

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

**IATA**

- **UN number**: UN3266
- **UN proper shipping name**: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE, SODIUM PHOSPHATES)
- **Transport hazard classes**
  - **Class**: 8
  - **Subsidiary risk**: -
  - **Packing group**: II
- **Environmental hazards**: No.
- **ERG Code**: 154
- **Special precautions for user**: Read safety instructions, SDS and emergency procedures before handling.

**IMDG**

- **UN number**: UN3266
UN proper shipping name: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE, SODIUM PHOSPHATES), RQ (SODIUM HYDROXIDE)

Transport hazard class(es):
- Class: 8
- Subsidiary risk: -
- Packing group: II

Environmental hazards:
- Marine pollutant: No.
- EmS: F-A-S-B

Special precautions for user:
Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

US federal regulations:
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

- TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
  Not regulated.
- CERCLA Hazardous Substance List (40 CFR 302.4)
  Sodium hydroxide (CAS 1310-73-2) Listed.
- SARA 304 Emergency release notification
  Not regulated.
  Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
- Hazard categories:
  Immediate Hazard - Yes
  Delayed Hazard - No
  Fire Hazard - No
  Pressure Hazard - No
  Reactivity Hazard - No
- SARA 302 Extremely hazardous substance
  Not listed.
- SARA 311/312 Hazardous chemical
  Yes
- SARA 313 (TRI reporting)
  Not regulated.
Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s).
A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Food and drug administration
ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

NSF Registered and/or meets
Registration No. – 146608
Category Code(s):
G5 Cooling and retort water treatment products
G6 Boiler treatment products, steam line products – food contact

US state regulations

US - Massachusetts RTK - Substance List
Sodium hydroxide (CAS 1310-73-2)

US - Pennsylvania RTK - Hazardous Substances
Sodium hydroxide (CAS 1310-73-2)

US - Rhode Island RTK
Sodium hydroxide (CAS 1310-73-2)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)
Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))
Sodium hydroxide (CAS 1310-73-2)

US. New Jersey Worker and Community Right-to-Know Act
Sodium hydroxide (CAS 1310-73-2)

US. Pennsylvania Worker and Community Right-to-Know Law
Sodium hydroxide (CAS 1310-73-2)

US. California Proposition 65
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin
No ingredient listed.

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

Issue date: Sep-26-2014
Revision date: Mar-17-2016
Version #: 2.0
List of abbreviations

CAS: Chemical Abstract Service Registration Number  
ACGIH: American Conference of Governmental Industrial Hygienists  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD$_{50}$: Lethal Dose, 50%  
LC$_{50}$: Lethal Concentration, 50%  
EC$_{50}$: Effect Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
EC-No: European Commission Number  
CLP: Regulation on classification, labeling and packaging of substances and mixtures  
DSD: Dangerous Substances Directive  
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road  
ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
RID: International Rule for Transport of Dangerous Substances by Railway  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

References:

No data available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information

This document has undergone significant changes and should be reviewed in its entirety.

Prepared by

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

* Trademark of General Electric Company. May be registered in one or more countries.
SAFETY DATA SHEET
CORTROL* OS5607

1. Identification

Product identifier
CORTROL OS5607

Other means of identification
None.

Recommended use
Water based dissolved oxygen scavenger/ metal passivator

Recommended restrictions
None known.

Company/undertaking identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA  19053
T 215 355 3300, F 215 953 5524

Emergency telephone
(800) 877 1940

2. Hazard(s) identification

Physical hazards
Not classified.

Health hazards
Sensitization, skin
Category 1B

OSHA defined hazards
Not classified.

Label elements

Signal word
Warning

Hazard statement
May cause an allergic skin reaction.

Precautionary statement

Prevention
Avoid breathing mist or vapor. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves.

Response
If on skin: Wash with plenty of water/. Specific treatment (see on this label). If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Storage
Store away from incompatible materials.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.
Dispose of contents/container to approved local facility.

Hazard(s) not otherwise classified (HNOC)
None known.

Supplemental information
None.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrazide</td>
<td>497-18-7</td>
<td>2.5 - 10</td>
</tr>
</tbody>
</table>
Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation
Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact
Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.

Eye contact
Rinse with water.

Ingestion
Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed
Dermatitis. Rash. May cause an allergic skin reaction.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions
Move containers from fire area if you can do so without risk.

General fire hazards
No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors or mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up
Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions
Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Contact with oxidisers, peroxide and metal oxide may result in a violent reaction. Contamination with low pH products and low grade metal accelerate decomposition to hydrazine. Avoid breathing mist or vapor. Avoid contact with skin. Avoid contact with eyes. Avoid prolonged exposure. Avoid contact with clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Shelf life 180 days. Store in a manner that minimizes potential contamination. Store only in vented containers. Protect from freezing. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits
No exposure limits noted for ingredient(s).

Biological limit values
No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls

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.

Individual protection measures, such as personal protective equipment

Eye/face protection
Splash proof chemical goggles.

Skin protection

Hand protection
Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Other
Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended. Chemical resistant gloves.

Respiratory protection
If ventilation is insufficient, suitable respiratory protection must be provided. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA’S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR’S USE.

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
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. 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>Color</td>
<td>Colorless to light yellow</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available.</td>
</tr>
<tr>
<td>pH (concentrated product)</td>
<td>8</td>
</tr>
<tr>
<td>pH in aqueous solution</td>
<td>7.4 (5% SOL.)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>32 °F (0 °C)</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>212 °F (100 °C)</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt; 200 °F (&gt; 93 °C) P-M(CC)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1 (Ether = 1)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Upper/lower flammability or explosive limits

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability limit - lower (%)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flammability limit - upper (%)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Explosive limit - upper (%)</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Vapor pressure
18 mm Hg

Vapor pressure temp.
70 °F (21 °C)

Vapor density
< 1 (Air = 1)

Relative density
1.02

Relative density temperature
70 °F (21 °C)

Solubility(ies)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solubility (water)</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Partition coefficient

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n-octanol/water)</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Auto-ignition temperature
Not available.

Decomposition temperature
Not available.

Viscosity
9 cps

Viscosity temperature
70 °F (21 °C)
Other information
Percent volatile 0 (Calculated)
Pour point 37 °F [3 °C]
Specific gravity 1.02

10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability Material is stable under normal conditions.
Possibility of hazardous reactions Hazardous polymerization does not occur.
Conditions to avoid Protect from freezing. Contact with water reactive compounds may cause fire or explosion. Avoid contact with incompatible materials.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition Oxides of carbon and nitrogen evolved in fire.

11. Toxicological information
Information on likely routes of exposure
Inhalation May cause irritation to respiratory organs.
Skin contact May cause an allergic skin reaction.
Eye contact Direct contact with eyes may cause temporary irritation.
Ingestion May cause gastrointestinal irritation.

Symptoms related to the physical, chemical and toxicological characteristics
Dermatitis. Rash. Prolonged and repetitive exposure, depending on the route(s), may develop transient irritation on skin, eyes, ingestion tract, and/or respiratory tract.

Information on toxicological effects
Acute toxicity May cause an allergic skin reaction.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORTROL* OS5607 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 5000 mg/kg, (Estimated value)</td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg, (Estimated value)</td>
</tr>
<tr>
<td>Components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrazide (CAS 497-18-7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization
Respiratory sensitization Not available.
Skin sensitization May cause an allergic skin reaction.
Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity
Not available.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens
Not available.

Reproductive toxicity
This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure
Not available.

Specific target organ toxicity - repeated exposure
Not available.

Aspiration hazard
May be harmful if swallowed and enters airways. Based on available data, the classification criteria are not met.

Chronic effects
Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORTROL OS5607 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% Mortality</td>
<td>Ceriodaphnia</td>
<td>96 mg/L, Static Renewal Bioassay, 48 hour</td>
</tr>
<tr>
<td>5% Mortality</td>
<td>Fathead Minnow</td>
<td>96 mg/L, Static Renewal Bioassay, 96 hour</td>
</tr>
<tr>
<td>LC50</td>
<td>Ceriodaphnia</td>
<td>160 mg/L, Static Renewal Bioassay, 48 hour</td>
</tr>
<tr>
<td></td>
<td>Fathead Minnow</td>
<td>260 mg/L, Static Renewal Bioassay, 96 hour</td>
</tr>
<tr>
<td>Aquatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Daphnia magna</td>
<td>850 mg/L, Static Renewal Bioassay, 48 hour</td>
</tr>
<tr>
<td>NOEL</td>
<td>Daphnia magna</td>
<td>190 mg/L, Static Renewal Bioassay, 48 hour</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Other adverse effects
Not available.

Persistence and degradability
No data available.

13. Disposal considerations

Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations
Dispose in accordance with all applicable regulations.

Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT
Not regulated as dangerous goods.

IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.
15. Regulatory information

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
Not listed.

SARA 304 Emergency release notification
Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

<table>
<thead>
<tr>
<th>Hazard categories</th>
<th>Immediate Hazard</th>
<th>Delayed Hazard</th>
<th>Fire Hazard</th>
<th>Pressure Hazard</th>
<th>Reactivity Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARA 302 Extremely hazardous substance</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous chemical
Yes

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSSL)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s). A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

US state regulations

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

US - Massachusetts RTK - Substance List
Not regulated.

US - Pennsylvania RTK - Hazardous Substances
Not regulated.

US - Rhode Island RTK
Not regulated.

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)
Not listed.

US. New Jersey Worker and Community Right-to-Know Act
Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law
Not listed.

US. California Proposition 65
WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.
US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
Hydrazine (CAS 302-01-2) Listed: January 1, 1988

US - California Proposition 65 - CRT: Listed date/Developmental toxin
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin
No ingredient listed.

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

Issue date: Nov-16-2014
Revision date: Dec-11-2015
Version #: 2.0

List of abbreviations
- CAS: Chemical Abstract Service Registration Number
- NFPA: National Fire Protection Association
- ACGIH: American Conference of Governmental Industrial Hygienists
- TWA: Time Weighted Average
- STEL: Short Term Exposure Limit
- LD50: Lethal Dose, 50%
- LC50: Lethal Concentration, 50%
- NOEL: No Observed Effect Level
- COD: Chemical Oxygen Demand
- BOD: Biochemical Oxygen Demand
- TOC: Total Organic Carbon
- IATA: International Air Transport Association
- IMDG: International Maritime Dangerous Goods Code

TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

References: No data available

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information
This document has undergone significant changes and should be reviewed in its entirety.

Prepared by
This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

* Trademark of General Electric Company. May be registered in one or more countries.
SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Substance
Substance name: Acetone
CAS No: 67-64-1
Product code: LC10420, LC10425
Formula: C3H6O
Synonyms: 2-propanone / beta-ketopropane / dimethyl formaldehyde / dimethyl ketone / dimethylketal / DMK (=dimethyl ketone) / keto propane / methyl ketone / pyroacetic acid / pyroacetic ether / pyroacetic spirit
BIG no: 10001

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture: Solvent
Cleansing product
Chemical raw material

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification
Flam. Liq. 2 H225
Eye Irrit. 2A H319
STOT SE 3 H336

2.2. Label elements

GHS-US labelling
Hazard pictograms (GHS-US): 

Signal word (GHS-US): Danger

Hazard statements (GHS-US): H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation
H336 - May cause drowsiness or dizziness

Precautionary statements (GHS-US): P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P233 - Keep container tightly closed
P240 - Ground/bond container and receiving equipment
P241 - Use explosion-proof electrical, lighting, ventilating equipment
P242 - Use only non-sparking tools
P243 - Take precautionary measures against static discharge
P261 - Avoid breathing mist, spray, vapours
P284 - Wash exposed skin thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective clothing, protective gloves
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
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 dry chemical powder, alcohol-resistant foam, carbon dioxide (CO2) for extinction
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
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P405 - Store locked up
P501 - Dispose of contents/container to comply with local, state and federal regulations
P235 - Keep cool

2.3. Other hazards
Other hazards not contributing to the classification
: None.

2.4. Unknown acute toxicity (GHS-US)
No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (Main constituent)</td>
<td>(CAS No) 67-64-1</td>
<td>100</td>
<td>Flam. Liq. 2, H225 Eye Irrit. 2A, H319 STOT SE 3, H336</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

First-aid measures after skin contact: Wash immediately with lots of water. Soap may be used. Do not apply (chemical) neutralizing agents. Remove clothing before washing. Take victim to a doctor if irritation persists.

First-aid measures after eye contact: Rinse immediately with plenty of water. Do not apply neutralizing agents. Take victim to an ophthalmologist if irritation persists.


4.2. Most important symptoms and effects, both acute and delayed
Symptoms/injuries: Not expected to present a significant hazard under anticipated conditions of normal use.
Symptoms/injuries after skin contact: ON CONTINUOUS EXPOSURE/CONTACT: Dry skin. Cracking of the skin.
Symptoms/injuries after eye contact: Irritation of the eye tissue.
Symptoms/injuries upon intravenous administration: Not available.

4.3. Indication of any immediate medical attention and special treatment needed
Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Unsuitable extinguishing media: Solid water jet ineffective as extinguishing medium.

5.2. Special hazards arising from the substance or mixture
Fire hazard: DIRECT FIRE HAZARD. Highly flammable. Gas/vapour flammable with air within explosion limits. INDIRECT FIRE HAZARD. May be ignited by sparks. Gas/vapour spreads at floor level: ignition hazard. Reactions involving a fire hazard: see "Reactivity Hazard".
## Acetone Safety Data Sheet

### Explosion hazard
DIRECT EXPLOSION HAZARD. Gas/vapour explosive with air within explosion limits. INDIRECT EXPLOSION HAZARD. Heat may cause pressure rise in tanks/drum: explosion risk. may be ignited by sparks. Reactions with explosion hazards: see "Reactivity Hazard".

### Reactivity
Upon combustion: CO and CO2 are formed. Violent to explosive reaction with many compounds. Prolonged storage: on exposure to light: release of harmful gases/vapours. Reacts violently with (strong) oxidizers: peroxidation resulting in increased fire or explosion risk.

### 5.3. Advice for firefighters

#### Firefighting instructions
Cool tanks/drum with water spray/remove them into safety. Physical explosion risk: extinguish/cool from behind cover. Do not move the load if exposed to heat. After cooling: persistent risk of physical explosion.

#### Protection during firefighting
Heat/fire exposure: compressed air/oxygen apparatus.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### For non-emergency personnel


##### For emergency responders
Protective equipment: Equip cleanup crew with proper protection.

Emergency procedures: Ventilate area.

#### 6.2. Environmental precautions

Prevent spreading in sewers.

#### 6.3. Methods and material for containment and cleaning up

For containment: Contain released substance, pump into suitable containers. Consult "Material-handling" to select material of containers. Plug the leak, cut off the supply. Dam up the liquid spill. Try to reduce evaporation. Measure the concentration of the explosive gas-air mixture. Dilute/disperse combustible gas/vapour with water curtain. Provide equipment/receptacles with earthing. Do not use compressed air for pumping over spills.

Methods for cleaning up: Take up liquid spill into inert absorbent material, e.g.: sand, earth, vermiculite. Scoop absorbed substance into closing containers. See "Material-handling" for suitable container materials. Spill must not return in its original container. Carefully collect the spill/leflovers. Damaged/empty tanks must be emptied. Do not use compressed air for pumping over spills. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

#### 6.4. Reference to other sections
See Heading 8. Exposure controls and personal protection.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Precautions for safe handling: Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Handle uncleaned empty containers as full ones. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Do not use compressed air for pumping over. Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Avoid prolonged and repeated contact with skin. Keep container tightly closed. Measure the concentration in the air regularly. Work under local exhaust/ventilation.

Hygiene measures: Do not eat, drink or smoke when using this product. Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

#### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep only in the original container in a cool, well ventilated place away from: Heat sources, Direct sunlight, incompatible materials. Keep container closed when not in use.

Incompatible products: Strong bases. Strong acids.

Incompatible materials: Sources of ignition. Direct sunlight.

Storage temperature: 15 - 20 °C


Special rules on packaging: SPECIAL REQUIREMENTS: closing: with pressure relief valve. clean. opaque. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.

Packaging materials: SUITABLE MATERIAL: steel. stainless steel. carbon steel. aluminium. iron. copper. nickel. bronze. glass. MATERIAL TO AVOID: synthetic material.

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Acetone (67-64-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA ACGIH</td>
</tr>
<tr>
<td>USA ACGIH</td>
</tr>
<tr>
<td>USA OSHA</td>
</tr>
<tr>
<td>USA OSHA</td>
</tr>
</tbody>
</table>

8.2. Exposure controls
Appropriate engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.


Hand protection: Gloves.
Eye protection: Protective goggles.
Skin and body protection: Head/neck protection. Protective clothing.
Respiratory protection: Wear gas mask with filter type A if conc. in air > exposure limit.
Other information: Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Liquid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>56.08 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless.</td>
</tr>
<tr>
<td>Odour</td>
<td>Aromatic odour. Sweet odour. Fruity odour.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>306 - 653 ppm</td>
</tr>
<tr>
<td></td>
<td>737 - 1574 mg/m³</td>
</tr>
<tr>
<td>pH</td>
<td>7</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>6</td>
</tr>
<tr>
<td>Relative evaporation rate (ether=1)</td>
<td>2</td>
</tr>
<tr>
<td>Melting point</td>
<td>-95 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>56 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>-18 °C</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>235 °C</td>
</tr>
<tr>
<td>Self ignition temperature</td>
<td>465 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>247 hPa</td>
</tr>
<tr>
<td>Vapour pressure at 50 °C</td>
<td>828 hPa</td>
</tr>
<tr>
<td>Critical pressure</td>
<td>47010 hPa</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>2.0</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.79</td>
</tr>
<tr>
<td>Relative density of saturated gas/air mixture</td>
<td>1.2</td>
</tr>
<tr>
<td>Density</td>
<td>786 kg/m³</td>
</tr>
</tbody>
</table>
### Section 1: Identification

**Product:** Acetone (CAS No: 67-64-1)

**Commercial name:**

**Synonyms:**

**Description:**

**Appearance:** Colorless liquid.

**Odor:** Characteristic acetone odor.

**Classification:** Flammable liquid, health hazard.

**Hazard class/label(s):** Flammable, eye irritant.

### Section 2:Danger and Precautionary Statements

**Hazard Statement:** Flammable solid, eye irritant.

**Precautionary Statement:** Use in a well-ventilated area.

**Emergency Procedures:**

**Extinguishing Media:** Water mist, foam, dry chemical.

**Hazardous Combustion Products:** CO, CO₂.

**Reactivity:**

- **Reactivity:** Non-reactive.
- **Stability:** Stable under normal conditions.
- **Incompatibility:** Strong bases.

### Section 3: First Aid Measures

**First Aid Measures:**

- **Inhalation:** Remove to fresh air; provide artificial respiration if necessary.
- **Eye Contact:** Rinse with大量清潔水,
- **Skin Contact:** Wash with大量清潔水.
- **Ingestion:** Do not induce vomiting.

**Specific Treatment:**

- **Inhalation:** Fresh air.
- **Eye Contact:** Medical attention.
- **Skin Contact:** Medical attention.
- **Ingestion:** Medical attention.

### Section 4: Fire Fighting Measures

**Extinguishing Media:** Water mist, foam, dry chemical.

**Special Fire Fighting Procedures:**

**Hazardous Combustion Products:** CO, CO₂.

**Reactivity:** Non-reactive.

### Section 5: Spill Response

**Personal Protection:** Wear appropriate protective clothing.

**Handling:**

- **General:**戴适当个人防护装备.
- **Waste Management:** Proper disposal.

**Precautions:**

- **Environmental:** Do not release to environment.
- **Precautions:** Wear appropriate protective equipment.

### Section 6: Accidental Release Measures

**Environmental Protection:**

- **Waste Disposal:** As per local regulations.

**Precautions:**

- **Waste Management:** Proper disposal.

### Section 7: Handling and Storage

**Precautions:**

- **Stability:** Stable.
- **Reactivity:** Non-reactive.

**Incompatible Materials:** Strong bases.

**Storage:**

- **Temperature:** Ambient.
- **Ventilation:** Good ventilation.

### Section 8: Exposure Controls/Personal Protection

**Respiratory Protection:** Not normally required.

**Eye Protection:** Not normally required.

**Skin Protection:** Not normally required.

**Body Protection:** Not normally required.

### Section 9: Physical and Chemical Properties

**Solubility:**

- Water: Complete
- Ethanol: Complete
- Ether: Complete
- Petroleum spirit: Complete
- Chloroform: Complete
- Dimethylformamide: Complete
- Oils/fats: Complete

**Log Pow:** -0.24 (Test data)

**Log Kow:** No data available

**Viscosity, kinematic:** 0.417 mm²/s

**Viscosity, dynamic:** 0.00033 Pa.s

**Explosive limits:** 2 - 12.8 vol %

60 - 310 g/m³

**Explosive properties:** None.

**Oxidising properties:** None.

**Explosive limits:**

9.2. Other information

**Minimum ignition energy:** 1.15 mJ

**Specific conductivity:** 500000 pS/m

**Saturation concentration:** 589 g/m³

**VOC content:** 100%

**Other properties:** Gas/vapour heavier than air at 20°C. Clear. Highly volatile. Substance has neutral reaction.

### Section 10: Stability and Reactivity

**10.1. Reactivity**

Upon combustion: CO and CO₂ are formed. Violent to explosive reaction with many compounds. Prolonged storage: on exposure to light: release of harmful gases/vapours. Reacts violently with (strong) oxidizers: peroxidation resulting in increased fire or explosion risk.

**10.2. Chemical stability**

Unstable on exposure to light.

**10.3. Possibility of hazardous reactions**

Not established.

**10.4. Conditions to avoid**

Direct sunlight. Extremely high or low temperatures.

**10.5. Incompatible materials**

Strong acids. Strong bases.

**10.6. Hazardous decomposition products**


### Section 11: Toxicological Information

**11.1. Information on toxicological effects**

**Acute toxicity**

- Not classified

**LD₅₀ oral rat:** 5800 mg/kg (Rat; Experimental value,Rat; Experimental value)

**LD₅₀ dermal rabbit:** 20000 mg/kg (Rabbit; Experimental value,Rabbit; Experimental value)

**LC₅₀ inhalation rat (mg/l):** 71 mg/l/4h (76 mg/l/4h; Rat; Experimental value,Experimental value,Experimental value,Experimental value)

**LC₅₀ inhalation rat (ppm):** 30000 ppm/4h (Rat; Experimental value,Rat; Experimental value)

**Skin corrosion/irritation:** Not classified

**pH:** 7

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

**pH:** 7

**Respiratory or skin sensitisation:** Not classified

**Germ cell mutagenicity:** Not classified

Based on available data, the classification criteria are not met

**Carcinogenicity:** Not classified

**Reproductive toxicity:** Not classified

Based on available data, the classification criteria are not met

**Specific target organ toxicity (single exposure):** May cause drowsiness or dizziness.
Acetone
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Specific target organ toxicity (repeated exposure) : Not classified
   Based on available data, the classification criteria are not met
Aspiration hazard : Not classified
   Based on available data, the classification criteria are not met
Symptoms/injuries after skin contact : ON CONTINUOUS EXPOSURE/CONTACT: Dry skin. Cracking of the skin.
Symptoms/injuries after eye contact : Irritation of the eye tissue.
Symptoms/injuries upon intravenous administration : Not available.

SECTION 12: Ecological information

12.1. Toxicity

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50 fishes 1</th>
<th>EC50 Daphnia 1</th>
<th>LC50 fish 2</th>
<th>TLM fish 1</th>
<th>TLM fish 2</th>
<th>Threshold limit other aquatic organisms 1</th>
<th>Threshold limit other aquatic organisms 2</th>
<th>Threshold limit algae 1</th>
<th>Threshold limit algae 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (67-64-1)</td>
<td>6210 mg/l (96 h; Pimephales promelas; NOMINAL CONCENTRATION)</td>
<td>8800 mg/l (48 h; Daphnia pulex)</td>
<td>5540 mg/l 96 h; Salmo gairdneri (Oncorhynchus mykiss)</td>
<td>13000 ppm (96 h; Gambusia affinis; TURBULENT WATER)</td>
<td>&gt; 1000 ppm (96 h; Pisces)</td>
<td>3000 mg/l (Plankton)</td>
<td>28 mg/l (Protozoa)</td>
<td>7500 mg/l (Scenedesmus quadricauda; PH = 7)</td>
<td>3400 mg/l (48 h; Chlorella sp.)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Substance</th>
<th>Persistence and degradability</th>
<th>Biochemical oxygen demand (BOD)</th>
<th>Chemical oxygen demand (COD)</th>
<th>ThOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (67-64-1)</td>
<td>Readily biodegradable in water. Biodegradable in the soil under anaerobic conditions. No (test)data on mobility of the substance available.</td>
<td>1.43 g O²/g substance</td>
<td>1.92 g O²/g substance</td>
<td>2.20 g O²/g substance</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Substance</th>
<th>BCF fish 1</th>
<th>BCF other aquatic organisms 1</th>
<th>Log Pow</th>
<th>Bioaccumulative potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (67-64-1)</td>
<td>0.69 (Pisces)</td>
<td>3</td>
<td>-0.24 (Test data)</td>
<td>Not bioaccumulative.</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Substance</th>
<th>Surface tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone (67-64-1)</td>
<td>0.0237 N/m</td>
</tr>
</tbody>
</table>

Other adverse effects

<table>
<thead>
<tr>
<th>Information</th>
<th>Avoid release to the environment.</th>
</tr>
</thead>
</table>

10/01/2013 EN (English) SDS ID: 75004
Acetone
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations: Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Remove to an authorized waste incinerator for solvents with energy recovery. Do not discharge into drains or the environment.

Additional information: LWCA (the Netherlands): KGA category 03. Hazardous waste according to Directive 2008/98/EC.

Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT

14.1. UN number

UN-No. (DOT): 1090
DOT NA no.: UN1090

14.2. UN proper shipping name

DOT Proper Shipping Name: Acetone
Department of Transportation (DOT) Hazard Classes: 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Hazard labels (DOT): 3 - Flammable liquids

Packing group (DOT): II - Medium Danger
DOT Special Provisions (49 CFR 172.102): IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized.

DOT Packaging Exceptions (49 CFR 173.xxx): 150
DOT Packaging Non Bulk (49 CFR 173.xxx): 202
DOT Packaging Bulk (49 CFR 173.xxx): 242

14.3. Additional information

Other information: No supplementary information available.
State during transport (ADR-RID): as liquid.

Overland transport

Packing group (ADR): II
Class (ADR): 3 - Flammable liquids
Hazard identification number (Kemler No.): 33
Classification code (ADR): F1
Danger labels (ADR): 3 - Flammable liquids

Orange plates:

Tunnel restriction code: D/E

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Acetone
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Transport by sea
DOT Vessel Stowage Location : B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

EmS-No. (1) : F-E
EmS-No. (2) : S-D

Air transport
DOT Quantity Limitations Passenger aircraft/rail : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

SECTION 15: Regulatory information

15.1. US Federal regulations

Acetone (67-64-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory.
RQ (Reportable quantity, section 304 of EPA's List of Lists) : 5000 lb

15.2. International regulations

CANADA

Acetone (67-64-1)
Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification
Class B Division 2 - Flammable Liquid
Class D Division 2 Subdivision B - Toxic material causing other toxic effects

EU-Regulations
No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Flam. Liq. 2 H225
Eye Irrit. 2 H319
STOT SE 3 H336

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC or 1999/45/EC
F; R11
Xi; R36
R66
R67

Full text of R-phrases: see section 16

15.2.2. National regulations

Acetone (67-64-1)
Listed on the Canadian Ingredient Disclosure List

15.3. US State regulations
No additional information available

SECTION 16: Other information

Indication of changes : Revision - See : *.
Other information : None.

Full text of H-phrases: see section 16:

Eye Irrit. 2A Serious eye damage/eye irritation, Category 2A
Flam. Liq. 2 Flammable liquids, Category 2

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## Acetone Safety Data Sheet

### Specific target organ toxicity — Single exposure, Category 3, Narcosis

<table>
<thead>
<tr>
<th>STOT SE 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H225</td>
<td>Highly flammable liquid and vapour</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H336</td>
<td>May cause drowsiness or dizziness</td>
</tr>
</tbody>
</table>

NFPA health hazard: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard: 3 - Liquids and solids that can be ignited under almost all ambient conditions.

NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

### HMIS III Rating

- **Health**: 1 Slight Hazard - Irritation or minor reversible injury possible
- **Flammability**: 3 Serious Hazard
- **Physical**: 0 Minimal Hazard
- **Personal Protection**: C

### SDS US (GHS HazCom 2012)

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.
Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

<table>
<thead>
<tr>
<th>Product Name: Acetylene, dissolved (MSDS No. P-4559-J)</th>
<th>Trade Names: Acetylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name: Acetylene</td>
<td>Synonyms: Acetylene, ethyne, ethyne, nacrylene</td>
</tr>
<tr>
<td>Chemical Family: Alkyne</td>
<td>Product Grades: Industrial, 2.6 atomic absorption</td>
</tr>
</tbody>
</table>

Telephone: Emergencies: 1-800-646-4633* Company Name: Praxair, Inc.
CHEMTREC: 1-800-424-9300* 39 Old Ridgebury Road
Routine: 1-800-PRA$AIR Danbury, CT 06810-5113

*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRA$AIR (1-800-772-9247).

2. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable gas under pressure.
Can form explosive mixtures with air.
Fusible plugs in top, bottom, or valve melt at 209-224°F (98-107°C).
Do not discharge at pressures above 15 psig (103 kPa).
May cause dizziness and drowsiness.
Self-contained breathing apparatus may be required by rescue workers.
At normal temperature and pressure, commercial acetylene is a colorless gas with a distinctive garlic-like odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, nausea, vomiting, and unconsciousness. The vapor from a liquid release may also cause incoordination, abdominal pain. Effects may be delayed. Lack of oxygen can kill.

Skin Contact. No harm expected from vapor. Liquid may cause frostbite.

Swallowing. An unlikely route of exposure, but frostbite of the lips and mouth may result from contact with the liquid. If swallowed, the liquid may cause nausea.

Eye Contact. Vapors containing acetylene may irritate the eyes. Liquid may irritate and cause frostbite.
Effects of Repeated (Chronic) Overexposure. No harm expected.

Other Effects of Overexposure. Asphyxiant. Lack of oxygen can kill.

Medical Conditions Aggravated by Overexposure. The toxicology and the physical and chemical properties of this product suggest that overexposure is unlikely to aggravate existing medical conditions.

CARCINOGENICITY: This product is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: None expected. For further information, see section 12, Ecological Information.

3. Composition/Information on Ingredients

This section covers materials of manufacture only. See sections 8, 10, 11, 15, and 16 for information on by-products generated during use, especially use in welding and cutting. See section 16 for important information about mixtures.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS NUMBER</th>
<th>CONCENTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylene</td>
<td>74-85-2</td>
<td>&gt;99%*</td>
</tr>
</tbody>
</table>

*The symbol > means "greater than."

NOTE: Acetylene cylinders are filled with a porous material containing acetone (CAS 67-64-1) into which the acetylene is dissolved.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING: If liquid is swallowed, immediately give two glasses of water and induce vomiting if victim is conscious. Call a physician.

EYE CONTACT: In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: Aspirated acetone may cause severe lung damage. If a large quantity of material has been swallowed, stomach contents should be evacuated quickly in a manner that avoids aspiration. Otherwise, there is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Extremely flammable gas. Forms explosive mixtures with air and oxidizing agents.

SUITABLE EXTINGUISHING MEDIA: See the following paragraphs. See CGA Pamphlet SB-4, Handling Acetylene Cylinders in Fire Situations, listed in section 16, for further information.

PRODUCTS OF COMBUSTION: Carbon monoxide, carbon dioxide
PROTECTION OF FIREFIGHTERS: DANGER! Flammable gas under pressure. Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance, taking care not to extinguish flames. If flames are accidentally extinguished, explosive re-ignition may occur. Use self-contained breathing apparatus. Remove ignition sources if without risk. Stop flow of gas if without risk while continuing cooling water spray. Remove all cylinders from area of fire if without risk. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. Heat of fire can build pressure in cylinder and cause it to rupture. Acetylene cylinders are provided with pressure relief devices designed to vent contents when exposed to elevated temperature. No part of a cylinder should be subjected to a temperature higher than 125°F (52°C). If venting or leaking acetylene catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive re-ignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an approved explosion meter.

5. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable gas under pressure.

Personal Precautions. Forms explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Shut off flow if without risk. Ventilate area or move leaking cylinder to well-ventilated area. Flammable gas may spread from leak. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Never use acetylene at pressures exceeding 15 psig (103.5 kPa). Can cause rapid suffocation due to oxygen deficiency. Close valve after each use; keep closed even when empty. Arrows and sparks can ignite combustible materials. Prevent fires. For more information on fire prevention in welding and cutting, see NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hotwork, published by the National Fire Protection Association, 1 Battery March Park, PO Box 9101, Quincy, MA 02269-9101; 1-800-344-3555; www.nfpa.org. Do not strike arc on a compressed gas cylinder. The defect produced by an arc burn could lead to cylinder rupture.

PRECAUTIONS TO BE TAKEN IN STORAGE: Acetylene storage in excess of 2,500 cu ft (70.79 m³) is prohibited in buildings with other occupancies. Store and use with adequate ventilation. Separate acetylene cylinders from oxygen and other oxidizers by at least 20 ft.
(5.1 m), or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least 3/4 hour. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 125°F (52°C). For other precautions in using acetylene, see section 16.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see Praxair publication P-14-153, Guidelines for Handling Gas Cylinders and Containers. Obtain from your local supplier.

### 8. Exposure Controls/Personal Protection

See section 16 for important information on by-products generated during use in welding and cutting.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>OSHA PEL</th>
<th>ACGIH TLV-TWA (2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylene</td>
<td>N.E.*</td>
<td>Simple asphyxiant</td>
</tr>
</tbody>
</table>

NOTE: Acetone, used as a solvent, has a TLV-TWA of 500 ppm for acetone and a TLV-STEL of 750 ppm (ACGIH, 2006). OSHA PEL, 1000 ppm, 2400 mg/m³.

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = Not available.

**ENGINEERING CONTROLS:**

- **Local Exhaust:** Use a local exhaust system, if necessary, to prevent oxygen deficiency and to keep hazardous fumes and gases in the worker's breathing zone below all applicable exposure limits.

- **Mechanical (General):** General exhaust ventilation may be acceptable if it can maintain an adequate supply of air and keep hazardous fumes and gases in the worker's breathing zone below all applicable exposure limits.

Special. None

Other. None

**PERSONAL PROTECTIVE EQUIPMENT:**

- **Skin Protection:** Wear work gloves when handling cylinders; welding gloves for welding and cutting.

- **Eye/Face Protection:** Wear goggles with filter lenses selected as per ANSI Z49.1. Provide protective screens and goggles, if necessary, to protect others. Select as per OSHA 29 CFR 1910.33. For welding, see section 10.

- **Respiratory Protection:** Use air-purifying or air-supplied respirators, as appropriate, where local or general exhaust ventilation is inadequate. Adequate ventilation must keep worker exposure below all applicable limits for fumes, gases, and other by-products of welding with acetylene. See sections 3, 10, and 16 for details. An air-supplied respirator must be used in confined spaces. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.
Other Protective Equipment. As needed, wear hand, head, and body protection, which help to prevent injury from radiation and sparks. See ANSI Z49.1. At a minimum, this includes welder’s gloves and protective goggles, and may include arm protectors, aprons, hats, and shoulder protection, as well as substantial clothing. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

APPEARANCE: Colorless gas.
ODOR: Acetylene of 100% purity is odorless, but commercial acetylene has a distinctive, garlic-like odor.
ODOR THRESHOLD: Not available.
PHYSICAL STATE: Gas at normal temperature and pressure.
PH: Not applicable.
SUBLIMATION POINT at 1 atm: -116°F (-83.3°C)
MELTING POINT at 10 psig (170 kPa abs): -115°F (-82.2°C)
BOILING POINT at 10 psig (170 kPa abs): -193.4°F (-78.2°C)
FLASH POINT: Not available.
EVAPORATION RATE (Butyl Acetate = 1): Not applicable.
FLAMMABILITY: Flammable.
FLAMMABLE LIMITS IN AIR, % by volume: LOWER: 2.5% UPPER: 100%
VAPOR PRESSURE at 70°F (21.1°C): 849.6 psia (4479 kPa abs)
VAPOR DENSITY at 32°F (0°C) and 1 atm: 0.07314 lb/ft³ (1.1715 kg/m³)
SPECIFIC GRAVITY (H₂O = 1): Not applicable.
SPECIFIC GRAVITY (Air = 1) at 32°F (0°C) and 1 atm: 0.906
SOLUBILITY IN WATER vol/vol at 32°F (0°C): 1.7
PARTITION COEFFICIENT: n-octanol/water: Not available.
AUTOIGNITION TEMPERATURE: 581°F (305°C) at 1 atm
DECOMPOSITION TEMPERATURE: Not available.
PERCENT VOLATILES BY VOLUME: 100
MOLECULAR WEIGHT: 26.04
MOLECULAR FORMULA: C₂H₂

*Maximum cylinder pressure: 250 psig (kPa) at 70°F (21.1°C)

10. Stability and Reactivity

CHEMICAL STABILITY: ☒ Unstable ☐ Stable
Acetylene is stable as shipped. Avoid use at pressures above 15 psig (103 kPa).

CONDITIONS TO AVOID: Elevated temperature and pressure and/or the presence of a catalyst.

INCOMPATIBLE MATERIALS: Copper, silver, mercury, or their alloys; oxidizing agents; acids; halogens; moisture.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition or burning may produce CO/CO₂. The welding and cutting process may form reaction products such as CO and CO₂. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.
POSSIBILITY OF HAZARDOUS REACTIONS:  

- Fire or explosion may result from use at elevated temperatures and pressures or from use with incompatible materials.

11. Toxicological Information

ACUTE DOSE EFFECTS: No known effects from acetylene gas. The welding process may generate hazardous fumes and gases. (See sections 8, 10, 15, and 16.)

12. Ecological Information

ECOTOXICITY: No adverse ecological effects expected.

OTHER ADVERSE EFFECTS: None known. Acetylene does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

DOT/CMO SHIPPING NAME: Acetylene, dissolved.

HAZARD CLASS: 2.1

PACKING GROUP: II

IDENTIFICATION NUMBER: UN1001

PRODUCT RO: None

SHIPPING LABEL(s): FLAMMABLE GAS

PLACARD (when required): FLAMMABLE GAS

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

MARINE POLLUTANTS: Acetylene is not listed as a marine pollutant by DOT.

15. Regulatory Information

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

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302);

Reportable Quantity (RQ): None
SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:
SECTION 302/304: Require emergency planning based on Threshold Planning
Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of
Extremely Hazardous Substances (EHS) (40 CFR Part 355):
TPQ: None
EHS RQ (40 CFR 355): None
SECTION 311/312: Require submission of MSDSs and reporting of chemical
inventories with identification of EPA hazard categories. The hazard categories for
this product are as follows:
IMMEDIATE: No
DELAYED: No
PRESSURE: Yes
REACTIVITY: Yes
FIRE: Yes
SECTION 313: Requires submission of annual reports of release of toxic chemicals
Acetylene is not subject to reporting under Section 313.
40 CFR 88: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL
RELEASE PREVENTION: Requires development and implementation of risk
management programs at facilities that manufacture, use, store, or otherwise handle
regulated substances in quantities that exceed specified thresholds.
Acetylene is listed as a regulated substance in quantities of 10,000 lb (4536 kg) or
greater.
TSCA: TOXIC SUBSTANCES CONTROL ACT: Acetylene is listed on the TSCA
inventory.
OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:
29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS
CHEMICALS: Requires facilities to develop a process safety management program
based on Threshold Quantities (TQ) of highly hazardous chemicals.
Acetylene is not listed in Appendix A as a highly hazardous chemical. However, any
process that involves a flammable gas on site in one location in quantities of 10,000
lb (4536 kg) or greater is covered under this regulation unless the gas is used as a
fuel.
STATE REGULATIONS:
CALIFORNIA: Acetylene is not listed by California under the SAFE DRINKING WATER
AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).
PENNSYLVANIA: Acetylene is subject to the PENNSYLVANIA WORKER AND
COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information
Be sure to read and understand all labels and instructions supplied with all containers of this
product.
ADDITIONAL SAFETY AND HEALTH HAZARDS: Using this product in welding and cutting
may create additional hazards.
Read and understand the manufacturer's instructions and the precautionary labels on the
products used in welding and cutting. For other safe practice information and a more-detailed
description of the health hazards of welding and their consequences, ask your welding products
Product: Acetylene, Dissolved  


FUMES AND GASES can be dangerous to your health and may cause serious lung disease.

- Keep your head out of fumes. Do not breathe fumes and gases. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes or may cause other similar discomfort.

Fumes and gases cannot be classified simply. The amount and type depend on the metal being worked and the process, procedure, equipment, and supplies used. Possible dangerous materials may be found in fluxes, electrodes, and other materials. Get an MSDS for every material you use.

Contaminants in the air may add to the hazard of fumes and gases. One such contaminant, chlorinated hydrocarbon vapors from cleaning and degreasing activities, poses a special risk.

To find the quantity and content of fumes and gases, you can take air samples. By analyzing these samples, you can find out what respiratory protection you need. One recommended sampling method is to take air from inside the worker’s helmet or from the worker's breathing zone. See AWS F1.1, Methods for Sampling and Analyzing Gases for Welding and Allied Processes, available from the American Welding Society, 550 N.W. Le Jeune Rd., Miami, FL 33126.

NOTES TO PHYSICIAN:

Acute: Gases, fumes, and dusts may cause irritation to the eyes, lungs, nose, and throat. Some toxic gases associated with welding and related processes may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty breathing, frequent coughing, or chest pains.

Chronic: Prolonged inhalation of air contaminants may lead to their accumulation in the lungs, a condition that may be seen as dense areas on chest x-rays. The severity of change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on x-rays may be caused by non-work-related factors such as smoking, etc.

PROTECTIVE CLOTHING AND EQUIPMENT FOR WELDING OPERATIONS:

PROTECTIVE GLOVES: Wear welding gloves.

EYE PROTECTION: Wear a helmet or use a face shield with a filter lens. Select lens per ANSI Z49.1. Provide protective screens and flash goggles if needed to protect others; select per OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Wear hand, head, and body protection. (See ANSI Z49.1) Worn as needed, these help prevent injury from radiation, sparks, and electrical shock. Minimum protection includes welder's gloves and a face shield.
added protection, consider arm protectors, aprons, hats, shoulder protection, and dark, substantial clothing.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: Flammable gas under pressure. Use piping and equipment adequately designed to withstand pressures to be encountered. Acetylene systems should be installed only by persons knowledgeable of the unique properties of acetylene and trained and experienced in such installation. All piped acetylene systems and associated equipment must be grounded. Electrical equipment must be non-sparking or explosion-proof. Leak check with soapy water; never use a flame. Use a backflow prevention device in any piping. In choosing tools and equipment, avoid materials incompatible with acetylene. Copper, silver, and mercury and their salts, compounds, and high-concentration alloys can form explosive compounds with acetylene. Never use copper piping for acetylene service; use only steel or wrought iron. Brass containing less than 65% copper and certain nickel alloys are generally acceptable for use in acetylene service but may not be adequate if high corrosion or excess moisture is present. Never work on a pressurized system. If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe manner in compliance with all federal, state, and local laws; then repair the leak. Never place a compressed gas cylinder where it may become part of an electrical circuit.

Mixtures. When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

<table>
<thead>
<tr>
<th>NFPA RATINGS:</th>
<th>HMIS RATINGS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH</td>
<td>HEALTH</td>
</tr>
<tr>
<td>FLAMMABILITY</td>
<td>FLAMMABILITY</td>
</tr>
<tr>
<td>INSTABILITY</td>
<td>PHYSICAL HAZARD</td>
</tr>
<tr>
<td>SPECIAL</td>
<td>= 0</td>
</tr>
<tr>
<td></td>
<td>= 4</td>
</tr>
<tr>
<td></td>
<td>= 2</td>
</tr>
<tr>
<td></td>
<td>= None</td>
</tr>
</tbody>
</table>

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

<table>
<thead>
<tr>
<th>THREADS</th>
<th>PIN-INDEXED YOKE</th>
<th>ULTRA-HIGH-INTEGRITY CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The CGA-510 connection is standard for cylinders of greater than 50 cu ft (1.42 m³) capacity. See CGA Pamphlet V-1 for other, limited-standard connections.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

Use the proper CGA connections. DO NOT USE ADAPTERS. Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.
Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, http://www.cganet.com/Publication.asp.

AV-1 Safe Handling and Storage of Compressed Gases
G-1.1 Commodity Specification for Acetylene
G-1 Acetylene
P-1 Safe Handling of Compressed Gases in Containers
SB-4 Handling Acetylene Cylinders in Fire Situations
SB-3 Use of Oxy-Fuel Gas Welding and Cutting Apparatus
V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
— Handbook of Compressed Gases, Fourth Edition

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information; (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user’s obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current MSDSs for these products, contact your Praxair sales representative or local distributor or supplier, or download from www.praxair.com. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR, Address: Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14151-0044).

Praxair and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.
SECTION 1: IDENTIFICATION

Product Identifier
Product Form: Mixture
Product Name: Aluminum Chlorohydrate

Intended Use of the Product
Use of the Substance/Mixture: Municipal and industrial water and wastewater treatment for the removal of turbidity, color, suspended solids and phosphorus. Sludge compaction and volume reduction. Lagoon treatment. Oily wastewater clarification and dissolved air flotation. Emulsion breaking. Paper machine pitch control. Retention and drainage aid, pitch control, and neutral size bonding agent for paper machines operating in the pH range of 6.0 to 7.8. Point of application to the paper machine is critical in obtaining maximum benefit. This product may be used on fourdrinier and cylinder machines, as well as twin wire formers. It is effective for a variety of paper and board grades.

Name, Address, and Telephone of the Responsible Party
Manufacturer
CHEMTRADE LOGISTICS INC.
155 Gordon Baker Road
Suite 300
Toronto, Ontario M2H 3N5
For SDS Info: (416) 496-5856
www.chemtradelogistics.com

Emergency Telephone Number
Emergency Number: Canada: CANUTEC +1-613-996-6666 / US: CHEMTREC +1-800-424-9300
Chemtrade Emergency Contact: (866) 416-4404
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
Eye Irrit. 2A H319

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) : GHS07

Signal Word (GHS-US) : Warning
Hazard Statements (GHS-US) : H319 - Causes serious eye irritation.
Precautionary Statements (GHS-US) : P264 - Wash hands, forearms, and face thoroughly after handling.
P280 - Wear eye protection, face protection, protective clothing, protective gloves.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 - If eye irritation persists: Get medical advice/attention.

Other Hazards
Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Product identifier</th>
<th>% (w/w)</th>
<th>Classification (GHS-US)</th>
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<tbody>
<tr>
<td>Water</td>
<td>(CAS No) 7732-18-5</td>
<td>40 - 70</td>
<td>Not classified</td>
</tr>
</tbody>
</table>
Aluminum Chlorohydrate
Safety Data Sheet
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Aluminum chloride, basic | (CAS No) 1327-41-9 | 40 - 70 | Eye Dam. 1, H318

Full text of H-phrases: see section 16
* The specific chemical identity and/or exact percentage of composition have been withheld as a trade secret within the meaning of the OSHA Hazard Communication Standard [29 CFR 1910.1200].

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures
General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).

Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Gently wash with plenty of soap and water followed by rinsing with water for at least 15 minutes. Call a POISON CENTER or doctor/physician if you feel unwell. Wash contaminated clothing before reuse.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing for at least 60 minutes. Immediately call a POISON CENTER or doctor/physician.

Ingestion: Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician.

Most Important Symptoms and Effects Both Acute and Delayed
General: Causes serious eye irritation. Causes skin irritation. May cause respiratory irritation.

Inhalation: May cause respiratory irritation.

Skin Contact: Causes skin irritation.

Eye Contact: Causes serious eye irritation.

Ingestion: Ingestion is likely to be harmful or have adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

Indication of Any Immediate Medical Attention and Special Treatment Needed
If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable.

Explosion Hazard: Product is not explosive.

Reactivity: Corrosive to metals. Contact with metals may evolve flammable hydrogen gas.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Oxides of aluminum.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Avoid all contact with skin, eyes, or clothing. Avoid breathing (vapor, mist, spray).

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).


For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Stop leak if safe to do so. Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.
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**Methods and Material for Containment and Cleaning Up**
For Containment: Collect spillage.
Methods for Cleaning Up: Absorb and/or contain spill with inert material, then place in suitable container.

**Reference to Other Sections**
See heading 8, Exposure Controls and Personal Protection. Concerning disposal elimination after cleaning, see item 13.

**SECTION 7: HANDLING AND STORAGE**

**Precautions for Safe Handling**
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Use good housekeeping practices during storage, transfer and handling.

**Conditions for Safe Storage, Including Any Incompatibilities**
Technical Measures: Comply with applicable regulations.
Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.
Specific End Use(s)
Municipal and industrial water and wastewater treatment for the removal of turbidity, color, suspended solids and phosphorus. Sludge compaction and volume reduction. Lagoon treatment. Oily wastewater clarification and dissolved air flotation. Emulsion breaking. Paper machine pitch control. Retention and drainage aid, pitch control, and neutral size bonding agent for paper machines operating in the pH range of 6.0 to 7.8. Point of application to the paper machine is critical in obtaining maximum benefit. This product may be used on fourdrinier and cylinder machines, as well as twin wire formers. It is effective for a variety of paper and board grades.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Control Parameters**
No Occupational Exposure Limits (OELs) have been established for this product or its chemical components.

**Exposure Controls**
Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.
Materials for Protective Clothing: Chemically resistant materials and fabrics.
Hand Protection: Wear chemically resistant protective gloves. Wear protective gloves made from PVC, neoprene, nitrile, vinyl, or PVC/NBR.
Eye Protection: Chemical goggles or safety glasses.
Skin and Body Protection: Wear suitable protective clothing.
Respiratory Protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of vapor or mist are expected to exceed exposure limits.
Environmental Exposure Controls: Do not allow the product to be released into the environment.
Consumer Exposure Controls: Do not eat, drink or smoke during use

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Information on Basic Physical and Chemical Properties**
Physical State : Liquid
Appearance : Colorless
Odor : Not available
Odor Threshold : Not available
pH : 2.5 - 4.4
Melting Point : Not applicable
Freezing Point : -4 °C (25 °F)
Boiling Point : Not available
Flash Point : Not flammable
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Auto-ignition Temperature : Not applicable
Decomposition Temperature : Not available
Flammability (solid, gas) : Not applicable
Lower Flammable Limit : Not applicable
Upper Flammable Limit : Not applicable
Vapor Pressure : Not available
Relative Vapor Density at 20 °C : Not available
Specific Gravity : 1.30 - 1.36
Solubility : 100%
Partition Coefficient: N-octanol/water : Not available
Viscosity : Not available
Explosion Data – Sensitivity to Mechanical Impact : Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge : Not expected to present an explosion hazard due to static discharge.

SECTION 10: STABILITY AND REACTIVITY
Reactivity: Corrosive to metals. Contact with metals may evolve flammable hydrogen gas.
Chemical Stability: Stable under recommended handling and storage conditions (see section 7).
Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Incompatible materials.
Hazardous Decomposition Products: Hydrochloric acid fumes may be generated.

SECTION 11: TOXICOLOGICAL INFORMATION
Information on Toxicological Effects - Product
Acute Toxicity: Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
pH: 2.5 - 4.4
Serious Eye Damage/Irritation: Causes serious eye irritation.
pH: 2.5 - 4.4
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not classified
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: May cause respiratory irritation.
Symptoms/Injuries After Skin Contact: Causes skin irritation.
Symptoms/Injuries After Eye Contact: Causes serious eye damage.
Symptoms/Injuries After Ingestion: Ingestion is likely to be harmful or have adverse effects.
Chronic Symptoms: None expected under normal conditions of use.

Information on Toxicological Effects - Ingredient(s)
LD50 and LC50 Data:

<table>
<thead>
<tr>
<th>Aluminum chloride, basic (1327-41-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 Oral Rat</td>
</tr>
<tr>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>LD50 Dermal Rat</td>
</tr>
<tr>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
</tr>
<tr>
<td>LD50 Oral Rat</td>
</tr>
<tr>
<td>&gt; 90000 mg/kg</td>
</tr>
</tbody>
</table>
### Aluminum Chlorohydrate

**Safety Data Sheet**

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#### SECTION 12: ECOLOGICAL INFORMATION

- **Toxicity**: Not classified
- **Persistence and Degradability**: Not available
- **Bioaccumulative Potential**: Not available
- **Mobility in Soil**: Not available
- **Other Adverse Effects**: Not available

#### SECTION 13: DISPOSAL CONSIDERATIONS

- **Waste Disposal Recommendations**: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

- **Ecology – Waste Materials**: Avoid release to the environment.

#### SECTION 14: TRANSPORT INFORMATION

- 14.1 In Accordance with DOT: Not regulated for transport
- 14.2 In Accordance with IMDG: Not regulated for transport
- 14.3 In Accordance with IATA: Not regulated for transport
- 14.4 In Accordance with TDG: Not regulated for transport

#### SECTION 15: REGULATORY INFORMATION

**US Federal Regulations**

<table>
<thead>
<tr>
<th>Aluminum Chlorohydrate</th>
<th>SARA Section 311/312 Hazard Classes</th>
<th>Immediate (acute) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum chloride, basic (1327-41-9)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
<td></td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
</tbody>
</table>

**US State Regulations**

- Neither this product nor its chemical components appear on any US state lists.

**Canadian Regulations**

<table>
<thead>
<tr>
<th>Aluminum Chlorohydrate</th>
<th>WHMIS Classification</th>
<th>Uncontrolled product according to WHMIS classification criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum chloride, basic (1327-41-9)</td>
<td>WHMIS Classification</td>
<td>Class E - Corrosive Material</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>WHMIS Classification</td>
<td>Uncontrolled product according to WHMIS classification criteria</td>
</tr>
</tbody>
</table>

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

#### SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

- **Revision date**: 05/04/15
- **Other Information**: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

**GHS Full Text Phrases**

| Eye Dam. 1 | Serious eye damage/eye irritation Category 1 |
| Eye Irrit. 2A | Serious eye damage/eye irritation Category 2A |
| H318 | Causes serious eye damage |
| H319 | Causes serious eye irritation |

**Party Responsible for the Preparation of This Document**

Date of Issue: 05/04/15  
EN (English US)  
SDS# CHE-6021S
Aluminum Chlorohydrate
Safety Data Sheet
According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

CHEMTRADE LOGISTICS, INC.
For SDS Info: (416) 496-5856

Handle product with due care and avoid unnecessary contact. This information is supplied under U.S. OSHA’S “Right to Know” (29 CFR 1910.1200) and Canada’s WHMIS regulations. Although certain hazards are described herein, we cannot guarantee these are the only hazards that exist. The information contained herein is based on data available to us and is believed to be true and accurate but it is not offered as a product specification. No warranty, expressed or implied, regarding the accuracy of this data, the hazards connected with the use of the product, or the results to be obtained from the use thereof, is made and Chemtrade and its affiliates assume no responsibility. Chemtrade is a member of the CIAC (Chemistry Industry Association of Canada) and adheres to the codes and principles of Responsible Care™.
SAFETY DATA SHEET

This Safety Data Sheet conforms to ANSI Z400.5, and to the format requirements and the International Chemical Safety Cards of the Global Harmonizing System. THIS SDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD) IMPORTANT: Read this SDS before handling & disposing of this product. Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

PRODUCT IDENTITY: AMMONIUM HYDROXIDE 11-35%
SDS NUMBER: CDS1750
NEW MSDS DATE: 02/02/2011
COMPANY IDENTITY: Univar USA Inc.
COMPANY ADDRESS: 17425 NE Union Hill Road
COMPANY CITY: Redmond, WA 98052
COMPANY PHONE: 1-425-889-3400
EMERGENCY PHONES: CHEMTREC: 1-800-424-9300 (USA)
CANUTEC: 1-613-996-6666 (CANADA)

SECTION 2. HAZARDS IDENTIFICATION

WARNING!

EXPOSURE PREVENTION: STRICT HYGIENE!

RISK STATEMENTS:
R34 Causes burns.
R50 Very toxic to aquatic organisms.

SAFETY STATEMENTS:
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45 In case of accident, or if you feel unwell, seek medical advice immediately. (Show the label where possible).
S61 Avoid release to the environment. Refer to special instructions/safety data sheet.

SEE SECTIONS 8, 11 & 12 FOR TOXICOLOGICAL INFORMATION.
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>WT %</th>
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<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>65-89</td>
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<tr>
<td>Aqua Ammonia</td>
<td>1336-21-6</td>
<td>-</td>
<td>11-35</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

IN ALL CASES CONSULT A PHYSICIAN!

EYE CONTACT:
- For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:
- In case of contact with skin immediately remove contaminated clothing.
- Wash thoroughly with soap & water. Wash contaminated clothing before reuse.

INHALATION:
- After high vapor exposure, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, trained personnel should immediately begin artificial respiration. If the heart has stopped, trained personnel should immediately begin cardiopulmonary resuscitation (CPR).

SWALLOWING:
- Rinse mouth. Give plenty of water to drink. Do NOT induce vomiting.
- GET MEDICAL ATTENTION IMMEDIATELY. Do NOT give liquids to an unconscious or convulsing person.

SECTION 5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION PREVENTIVE MEASURES
- Not Applicable.

EXTINGUISHING MEDIA
- Use dry powder, carbon dioxide, In case of fire in surroundings, use appropriate extinguishing media.

SPECIAL FIRE FIGHTING PROCEDURES
- Water spray may be ineffective on fire but can protect fire-fighters & cool closed containers. Use fog nozzles if water is used.
- Do not enter confined fire-space without full bunker gear.
  (Helmet with face shield, bunker coats, gloves & rubber boots).
- Use NIOSH approved positive-pressure self-contained breathing apparatus.
SECTION 5. FIRE FIGHTING MEASURES (CONTINUED)

UNUSUAL EXPLOSION AND FIRE PROCEDURES
Isolate from oxidizers, acids, heat, & open flame. Closed containers may explode if exposed to extreme heat. Applying to hot surfaces requires special precautions.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTIVE MEASURES:
EVACUATE DANGER AREA! Consult an expert!
Keep unprotected personnel away.
Use complete chemical protective suit with self-contained breathing apparatus.

ENVIRONMENTAL PRECAUTIONS:
Do NOT let this chemical enter the environment.
Keep from entering storm sewers and ditches which lead to waterways.

CONTAINMENT AND CLEAN-UP MEASURES:
Stop spill at source. Dike and contain. Cautiously neutralize spilled liquid with a dilute acid, such as dilute sulfuric acid. Wash away remainder with plenty of water.

SECTION 7. HANDLING AND STORAGE

HANDLING
Use only with adequate ventilation. Avoid breathing of vapor or spray mist. Do not get in eyes, on skin or clothing. Wear OSHA Standard full face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse. To minimize static discharge when transferring, ensure electrical continuity by bonding and grounding all equipment. Use an inlet line diameter of at least 3.5 inches (8.9 centimeters) with a maximum flow rate of 1 meter/second.

STORAGE
Strong oxidants, food & feedstuffs. Keep cool. Keep inside a well-ventilated room. When using, loosen bung slowly to relieve pressure. Do not store above 38 C/100 F. Keep container tightly closed & upright when not in use to prevent leakage. Wear full face shield, gloves & full protective clothing when opening or handling. When empty, drain completely, replace bungs securely.
SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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<tr>
<th>MATERIAL</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>TWA (OSHA)</th>
<th>TLV (ACGIH)</th>
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<td>7732-18-5</td>
<td>231-791-2</td>
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<td>None Known</td>
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<tr>
<td>Aqua Ammonia</td>
<td>1336-21-6</td>
<td>-</td>
<td>50 ppm</td>
<td>25 ppm</td>
</tr>
</tbody>
</table>

MATERIAL                        | CAS#     | EINECS# | CEILING | STEL(OSHA/ACGIH) | HAP |
<table>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Aqua Ammonia</td>
<td>1336-21-6</td>
<td>-</td>
<td>None Known</td>
<td>35 ppm</td>
<td>No</td>
</tr>
</tbody>
</table>

This product contains no EPA Hazardous Air Pollutants (HAP) in amounts > 0.1%.

RESPIRATORY EXPOSURE CONTROLS
A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z86.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator’s use.

VENTILATION
LOCAL EXHAUST: Necessary
MECHANICAL (GENERAL): Necessary
SPECIAL: None
OTHER: None


PERSONAL PROTECTIONS:
Wear OSHA Standard full face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.

WORK & HYGIENIC PRACTICES:
Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated leather articles. Launder or discard contaminated clothing.
SECTION 9. PHYSICAL & CHEMICAL PROPERTIES

APPEARANCE: Liquid, Water-White
ODOR: Ammonia
ODOR THRESHOLD: Not Available
pH (Neutrality): 13.0
MELTING POINT/FREEZING POINT: Not Available
BOILING RANGE (IBP, 50%, Dry Point): 37 92 100 C / 100 198 212 F
FLASH POINT (TEST METHOD): Not Applicable
EVAPORATION RATE (n-BUTYL ACETATE=1): 0.254
FLAMMABILITY CLASSIFICATION: Non-Combustible
LOWER FLAMMABLE LIMIT IN AIR (% by vol): Not Applicable
UPPER FLAMMABLE LIMIT IN AIR (% by vol): Not Available
VAPOR PRESSURE (mm of Hg)@20 C: 51.3
VAPOR DENSITY (air=1): 0.768
GRAVITY @ 68/68 F / 20/20 C:
   SPECIFIC GRAVITY (Water=1): 0.967
POUNDS/GALLON: 8.057
WATER SOLUBILITY: Complete
PARTITION COEFFICIENT (n-Octane/Water): Not Available
AUTO IGNITION TEMPERATURE: Not Applicable
DECOMPOSITION TEMPERATURE: Not Available
VOC'S (>0.44 Lbs/Sq In): 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal
TOTAL VOC'S (TVOC)*: 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal
NONEXEMPT VOC'S (CVOC)*: 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal
HAZARDOUS AIR POLLUTANTS (HAPS): 0.0 Wt% / 0.0 g/L / 0.000 Lbs/Gal
NONEXEMPT VOC PARTIAL PRESSURE (mm of Hg @ 20 C): 0.0

* Using California South Coast Air Quality Management District (SCAQMD) Rule 443.1.

SECTION 10. STABILITY & REACTIVITY

STABILITY
Stable under normal conditions.

CONDITIONS TO AVOID
Isolate from heat, & open flame.

MATERIALS TO AVOID
Isolate from oxidizers, and acids.

HAZARDOUS DECOMPOSITION PRODUCTS
Nitrogen Oxide, and Ammonia vapors from heating.

HAZARDOUS POLYMERIZATION
Will not occur.
SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE HAZARDS

EYE & SKIN CONTACT:
Severe burns to skin, defatting, dermatitis.
This product may cause allergic skin reaction.
Severe burns to eyes, redness, tearing, blurred vision.
Liquid can cause severe skin & eye burns. Wash thoroughly after handling.

INHALATION:
Severe respiratory tract irritation may occur. Vapor harmful. can cause Allergic respiratory or asthma-like reaction.

SWALLOWING:
Harmful or fatal if swallowed.

SUBCHRONIC HAZARDS/CONDITIONS AGGRAVATED

CONDITIONS AGGRAVATED
Persons with severe skin, liver or kidney problems should avoid use.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:
This product has no carcinogens listed by IARC, NTP, NIOSH,
OSHA or ACGIH, as of this date, greater or equal to 0.1%.

MAMMALIAN TOXICITY INFORMATION

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>LOWEST KNOWN LETHAL DOSE DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqua Ammonia</td>
<td>1336-21-6</td>
<td>-</td>
<td>LOWEST KNOWN LD50 (ORAL) 250.0 mg/kg(Cats)</td>
</tr>
<tr>
<td>Aqua Ammonia</td>
<td>1336-21-6</td>
<td>-</td>
<td>LOWEST KNOWN LC50 (VAPORS) 1000 ppm (Mice)</td>
</tr>
</tbody>
</table>
SECTION 12. ECOLOGICAL INFORMATION

AQUATIC ANIMAL INFORMATION:
The most sensitive known aquatic group to any component of this product is:
Daphnia Pulex 2.4 ppm or mg/L (48 hour exposure).
Keep out of sewers and natural water supplies.
The substance is very toxic to aquatic organisms.

MOBILITY IN SOIL
This material is a mobile liquid.

DEGRADABILITY
This product is completely biodegradable.

ACCUMULATION
This product does not accumulate or biomagnify in the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Processing, use or contamination may change the waste management options.
Recycle / dispose of observing national, regional, state, provincial and local
health, safety & pollution laws. If in doubt, contact appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: UN2672, RQ, Ammonia solution, 8, PG-III
DRUM LABEL: (CORROSIVE)
IATA / ICAO: UN2672, Ammonia solution, 8, PG-III
IMO / IMDG: UN2672, Ammonia solution, 8, PG-III
EMERGENCY RESPONSE GUIDEBOOK NUMBER: 154

> 3571 LB / 1623 KG OF THIS PRODUCT IN 1 CONTAINER EXCEEDS THE "RQ" OF AQUA AMMONIA.

SECTION 15. REGULATORY INFORMATION

EPA REGULATION:
SARA SECTION 311/312 HAZARDS: Acute Health

All components of this product are on the TSCA list.
This material contains no known products restricted under SARA Title III,
Section 313 in amounts greater or equal to 1%.

SARA TITLE III INGREDIENTS  CAS#  EINECS#  WT%  (REG.SECTION)  RQ(LBS)
Aqua Ammonia  1336-21-6  -  11-35  (311,312)  1000
SECTION 15. REGULATORY INFORMATION (CONTINUED)

> 3571 LB / 1623 KG of this product in 1 container exceeds the "RQ" of aqua ammonia. Any release equal to or exceeding the RQ must be reported to the National Response Center (800-424-8802) and appropriate state and local regulatory agencies as described in 40 CFR 302.6 and 40 CFR 355.40 respectively. Failure to report may result in substantial civil and criminal penalties. State & local regulations may be more restrictive than federal regulations.

STATE REGULATIONS:
CALIFORNIA PROPOSITION 65: This product contains no chemicals known to the State of California to cause cancer & reproductive toxicity.

INTERNATIONAL REGULATIONS
The components of this product are listed on the chemical inventories of the following countries: Australia (AICS), Canada (DSL, NDSL), China (IECSC), Europe (EINECS, ELINCS), Japan (METI/CSCL, MHLW/ISHL), South Korea (KECI), New Zealand (NZIoC), Philippines (PICCS), Switzerland (SWISS), Taiwan (NECSI), USA (TSCA).

CANADA: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
D2B: Irritating to skin / eyes.
E: Corrosive Material.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:
HEALTH (NFPA): 3, HEALTH (HMIS): 3, FLAMMABILITY: 0, REACTIVITY: 0
(Personal Protection Rating to be supplied by user based on use conditions.)
This information is intended solely for the use of individuals trained in the NFPA & HMIS hazard rating systems.

EMPLOYEE TRAINING
See Section 2 for Risk & Safety Statements. Employees should be made aware of all hazards of this material (as stated in this SDS) before handling it.
Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar’s control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.
SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

<table>
<thead>
<tr>
<th>Product form</th>
<th>Mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>DWT 672E Anionic Flocculant</td>
</tr>
<tr>
<td>Product code</td>
<td>000672</td>
</tr>
</tbody>
</table>

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture: Water Treatment Agent

1.3. Details of the supplier of the safety data sheet

Dober Chemical Corp
11230 Katherine's Crossing
Suite 100
Woodridge, IL 60517 - US
T 630-410-7300 - F 630-410-7444
gerulatory@dobergroup.com - www.dobergroup.com

1.4. Emergency telephone number

Emergency number: 1-800-255-3924 / 1-813-248-0585
ChemTel

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification
Aquatic Acute 3 H402
Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labelling
Hazard statements (GHS-US): H402 - Harmful to aquatic life
Precautionary statements (GHS-US): P273 - Avoid release to the environment
P501 - Dispose in a safe manner in accordance with local/national regulations

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillates (petroleum), hydrotreated light</td>
<td>(CAS No) 64742-47-8</td>
<td>10 - 30</td>
<td>Flam. Liq. 3, H226 Asp. Tox. 1, H304 Aquatic Acute 2, H401</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation: Assure fresh air breathing. Allow the victim to rest.

First-aid measures after skin contact: Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact: Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.
**DWT 672E Anionic Flocculant**

**Safety Data Sheet**

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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### First-aid measures after ingestion

- **Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.**

### 4.2. Most important symptoms and effects, both acute and delayed

- **Symptoms/injuries**: Not expected to present a significant hazard under anticipated conditions of normal use.

### 4.3. Indication of any immediate medical attention and special treatment needed

- **No additional information available**

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- **Unsuitable extinguishing media**: Do not use a heavy water stream.

#### 5.2. Special hazards arising from the substance or mixture

- **No additional information available**

#### 5.3. Advice for firefighters

- **Firefighting instructions**: Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
- **Protection during firefighting**: Do not enter fire area without proper protective equipment, including respiratory protection.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- **For non-emergency personnel**
  - **Emergency procedures**: Evacuate unnecessary personnel.

- **For emergency responders**
  - **Protective equipment**: Equip cleanup crew with proper protection.
  - **Emergency procedures**: Ventilate area.

#### 6.2. Environmental precautions

- **Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.**

#### 6.3. Methods and material for containment and cleaning up

- **Methods for cleaning up**: Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

#### 6.4. Reference to other sections

- **See Heading 8. Exposure controls and personal protection.**

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- **Precautions for safe handling**: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour. No smoking.

#### 7.2. Conditions for safe storage, including any incompatibilities

- **Storage conditions**: Keep only in the original container in a cool, well-ventilated place. Keep container closed when not in use.
- **Incompatible products**: Strong bases. Strong acids.
- **Incompatible materials**: Sources of ignition. Direct sunlight.

#### 7.3. Specific end use(s)

- **No additional information available**

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

<table>
<thead>
<tr>
<th><strong>DWT 672E Anionic Flocculant</strong></th>
<th>ACGIH</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACGIH</strong></td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td><strong>OSHA</strong></td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td><strong>Distillates (petroleum), hydrotreated light (64742-47-8)</strong></td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td><strong>ACGIH</strong></td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
DWT 672E Anionic Flocculant
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according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 8.2. Exposure controls

**Hand protection**: Wear protective gloves/protective clothing/eye protection/face protection protective gloves.

**Eye protection**: Chemical goggles or safety glasses.

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

**Other information**: Do not eat, drink or smoke during use.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Emulsion.</td>
</tr>
<tr>
<td>Colour</td>
<td>White to light gray</td>
</tr>
<tr>
<td>Odour</td>
<td>Not available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>6 - 8</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not Available.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>≥ 93.3 °C</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>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not Available.</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>Not Available.</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Density</td>
<td>1.007 g/ml</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Not available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>1250 cP</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 9.2. Other information

**VOC content**: 22 %

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available.

#### 10.2. Chemical stability

Not established.

#### 10.3. Possibility of hazardous reactions

Not established.

#### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.
10.5. Incompatible materials
Strong acids. Strong bases.

10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Acute toxicity</th>
<th>Not classified</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distillates (petroleum), hydrotreated light (64742-47-8)</strong></td>
<td></td>
</tr>
<tr>
<td>LD50 oral rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
<tr>
<td>LD50 dermal rabbit</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>LC50 inhalation rat (mg/l)</td>
<td>&gt; 5.2 mg/l/4h</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH: 6 - 8</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH: 6 - 8</td>
<td></td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Potential adverse human health effects and symptoms</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

SECTION 12: Ecological information

12.1. Toxicity
Ecology - water: Harmful to aquatic life.

<table>
<thead>
<tr>
<th>Distillates (petroleum), hydrotreated light (64742-47-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fishes 1</td>
<td>45 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])</td>
</tr>
<tr>
<td>LC50 fish 2</td>
<td>2.2 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
DWT 672E Anionic Flocculant
Persistence and degradability: Not established.

12.3. Bioaccumulative potential
DWT 672E Anionic Flocculant
Bioaccumulative potential: Not established.

<table>
<thead>
<tr>
<th>Distillates (petroleum), hydrotreated light (64742-47-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BCF fish 1</td>
<td>61 - 159</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
Effect on the global warming: No known ecological damage caused by this product.

Other information: Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste disposal recommendations: Dispose in a safe manner in accordance with local/national regulations.
Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

UN-No.(DOT) : Non Regulated

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Not applicable

14.3. Transport hazard class(es)

Department of Transportation (DOT) Hazard Classes : Not applicable

14.4. Packing group

Packing group (DOT) : Not applicable

14.5. Environmental hazards

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Distillates (petroleum), hydrotreated light (64742-47-8)

Listed on the Canadian DSL (Domestic Substances List)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

Other information : None.

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H-phrase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Acute 2</td>
<td>Hazardous to the aquatic environment — Acute Hazard, Category 2</td>
</tr>
<tr>
<td>Aquatic Acute 3</td>
<td>Hazardous to the aquatic environment — Acute Hazard, Category 3</td>
</tr>
<tr>
<td>Asp. Tox. 1</td>
<td>Aspiration hazard, Category 1</td>
</tr>
<tr>
<td>Flam. Liq. 3</td>
<td>Flammable liquids, Category 3</td>
</tr>
<tr>
<td>H226</td>
<td>Flammable liquid and vapour</td>
</tr>
<tr>
<td>H304</td>
<td>May be fatal if swallowed and enters airways</td>
</tr>
<tr>
<td>H401</td>
<td>Toxic to aquatic life</td>
</tr>
<tr>
<td>H402</td>
<td>Harmful to aquatic life</td>
</tr>
</tbody>
</table>
DWT 672E Anionic Flocculant
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<table>
<thead>
<tr>
<th>NFPA health hazard</th>
<th>2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA fire hazard</td>
<td>1 - Must be preheated before ignition can occur.</td>
</tr>
<tr>
<td>NFPA reactivity</td>
<td>0 - Normally stable, even under fire exposure conditions, and are not reactive with water.</td>
</tr>
<tr>
<td>NFPA specific hazard</td>
<td>NA - Not Applicable</td>
</tr>
</tbody>
</table>

HMIS III Rating

- Health: 2 - Temporary or minor injury may occur
- Flammability: 1
- Physical: 0
- Personal Protection: B

Dober SDS US

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
Section 1. Identification

GHS product identifier : Aqua Ammonia (20-30%)
Other means of identification : Aqua Ammonia, Ammonium Hydroxide
Product type : Liquid.
Product use : Synthetic/Analytical chemistry.
Synonym : Aqua Ammonia, Ammonium Hydroxide
SDS # : 001195
Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture : SKIN CORROSION - Category 1B
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 1

GHS label elements
Hazard pictograms : 

Signal word : Danger
Hazard statements : May displace oxygen and cause rapid suffocation.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

Precautionary statements
General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
Prevention : Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor. Wash hands thoroughly after handling.
Response : Collect spillage. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage : Store locked up.
Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.
Aqua Ammonia (20-30%)

Section 2. Hazards identification

Hazards not otherwise classified: None known.

Section 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Substance/mixture</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqua Ammonia</td>
<td>100</td>
<td>1336-21-6</td>
</tr>
<tr>
<td>WATER</td>
<td>70 - 80</td>
<td>7732-18-5</td>
</tr>
<tr>
<td>ammonia</td>
<td>20 - 30</td>
<td>7664-41-7</td>
</tr>
</tbody>
</table>

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Inhalation: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact: Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact: No known significant effects or critical hazards.
Inhalation: May cause respiratory irritation.
Skin contact: Causes severe burns.
Section 4. First aid measures

Frostbite: Try to warm up the frozen tissues and seek medical attention.

Ingestion: No known significant effects or critical hazards.

Over-exposure signs/symptoms

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

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

Notes to physician: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products: Decomposition products may include the following materials: nitrogen oxides

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

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

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.
**Section 6. Accidental release measures**

**Methods and materials for containment and cleaning up**

**Small spill**
- Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill**
- Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

**Section 7. Handling and storage**

**Precautions for safe handling**

**Protective measures**
- Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Avoid release to the environment. Do not ingest. Empty containers retain product residue and can be hazardous. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Do not breathe vapor or mist.

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

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

**Section 8. Exposure controls/personal protection**

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqua Ammonia</td>
<td>None.</td>
</tr>
<tr>
<td>WATER ammonia</td>
<td>None.</td>
</tr>
</tbody>
</table>

**Exposure limits**

- **California PEL for Chemical Contaminants (Table AC-1) (United States).**  
  - PEL: 25 ppm 8 hours.  
  - STEL: 35 ppm 15 minutes.  
- **ACGIH TLV (United States, 3/2017).**  
  - TWA: 25 ppm 8 hours.  
  - TWA: 17 mg/m³ 8 hours.  
  - STEL: 35 ppm 15 minutes.  
  - STEL: 24 mg/m³ 15 minutes.  
- **OSHA PEL 1989 (United States, 3/1989).**  
  - STEL: 35 ppm 15 minutes.  
  - STEL: 27 mg/m³ 15 minutes.  
- **NIOSH REL (United States, 10/2016).**  
  - TWA: 25 ppm 10 hours.  
  - TWA: 18 mg/m³ 10 hours.
### Section 8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Environmental exposure controls</th>
<th>STEL: 35 ppm 15 minutes. STEL: 27 mg/m³ 15 minutes. OSHA PEL (United States, 6/2016). TWA: 50 ppm 8 hours. TWA: 35 mg/m³ 8 hours.</th>
</tr>
</thead>
</table>

#### Appropriate engineering controls
- Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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

### Individual protection measures

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

#### Eye/face protection
- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

#### Skin protection

##### Hand protection
- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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

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

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

### Section 9. Physical and chemical properties

#### Appearance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>5 ppm</td>
</tr>
<tr>
<td>pH</td>
<td>Approx. 11.6 for 1 N Sol'n. in water</td>
</tr>
<tr>
<td>Melting point</td>
<td>-35°F (20% solution) to -115°F (30% solution)</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Lowest known value: 38°C (100.4°F) (ammonia). Weighted average: 65.56°C (150°F)</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available.</td>
</tr>
</tbody>
</table>
Aqua Ammonia (20-30%)

Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporation rate</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Extremely flammable in the presence of the following materials or conditions: Oxidizing</td>
</tr>
</tbody>
</table>
| Lower and upper explosive limits| Lower: 16%  
Upper: 25% |
| Vapor pressure                  | 3-10 PSI @ 16 °C |
| Vapor density                   | Vapor density 0.6 (Air = 1) (ammonia) |
| Specific Volume (ft³/lb)        | 20.79 |
| Gas Density (lb/ft³)            | 0.0481 |
| Relative density                | 0.6 |
| Solubility in water             | Complete 540 g/l |
| Partition coefficient: n-octanol/water | Not available. |
| Auto-ignition temperature       | 651°C (1203.8°F) |
| Decomposition temperature       | Not available. |
| Viscosity                       | Not available. |
| Flow time (ISO 2431)            | Not available. |

Section 10. Stability and reactivity

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

Section 11. Toxicological information

Information on toxicological effects

| Acute toxicity                  | | |
|---------------------------------|---|---|---|---|
| **Product/ingredient name**     | **Result** | **Species** | **Dose** | **Exposure** |
| Aqua Ammonia ammonia            | LD50 Oral   | Rat         | 350 mg/kg | - |
|                                 | LC50 Inhalation Gas | Rat | 7338 ppm | 1 hours |

| Irritation/Corrosion            | | |
|---------------------------------|---|---|---|---|
| **Product/ingredient name**     | **Result** | **Species** | **Score** | **Exposure** | **Observation** |
| Aqua Ammonia                    | Eyes - Severe irritant | Rabbit | - | 250 Micrograms | - |
|                                 | Eyes - Severe irritant | Rabbit | - | 0.5 minutes 1 milligrams | - |

Sensitization

| Date of issue/Date of revision | Date of previous issue | Version | |
|-------------------------------|------------------------|---------|---|---|---|---|
| 2/15/2018                     | 2/15/2018              | 0.09    | 6/12 |
Section 11. Toxicological information

Not available.

Mutagenicity
Not available.

Carcinogenicity
Not available.

Reproductive toxicity
Not available.

Teratogenicity
Not available.

Specific target organ toxicity (single exposure)

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

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure
Not available.

Potential acute health effects

<table>
<thead>
<tr>
<th>Route of exposure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye contact</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>Causes severe burns.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

Symptoms related to the physical, chemical and toxicological characteristics

<table>
<thead>
<tr>
<th>Route of exposure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye contact</td>
<td>Adverse symptoms may include the following: pain, watering, redness</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Adverse symptoms may include the following: respiratory tract irritation, coughing</td>
</tr>
<tr>
<td>Skin contact</td>
<td>Adverse symptoms may include the following: pain or irritation, redness, blistering may occur</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Adverse symptoms may include the following: stomach pains</td>
</tr>
</tbody>
</table>

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

Short term exposure

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential immediate effects</td>
<td>Not available.</td>
</tr>
<tr>
<td>Potential delayed effects</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Long term exposure

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential immediate effects</td>
<td>Not available.</td>
</tr>
<tr>
<td>Potential delayed effects</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Potential chronic health effects
Not available.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>
Section 11. Toxicological information

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

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

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

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

**Numerical measures of toxicity**

**Acute toxicity estimates**

Not available.

Section 12. Ecological information

**Toxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqua Ammonia ammonia</td>
<td>Acute LC50 37 ppm Fresh water</td>
<td>Fish - Gambusia affinis - Adult</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 29.2 mg/l Marine water</td>
<td>Algae - Ulva fasciata - Zoea</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2080 µg/l Fresh water</td>
<td>Crustaceans - Gammarus pulex</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 0.53 ppm Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 300 µg/l Fresh water</td>
<td>Fish - Hypophthalmichthys nobilis</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 0.204 mg/l Marine water</td>
<td>Fish - Dicentrarchus labrax</td>
<td>62 days</td>
</tr>
</tbody>
</table>

**Persistence and degradability**

Not available.

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>-1.38</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

| Soil/water partition coefficient (K_{oc}) | : Not available. |

**Other adverse effects**

: No known significant effects or critical hazards.

Section 13. Disposal considerations

**Disposal methods**

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
# Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN2672</td>
<td>UN2672</td>
<td>UN2672</td>
<td>UN2672</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>Ammonium Hydroxide or Ammonia solutions</td>
<td>AMMONIA SOLUTION</td>
<td>AMMONIA SOLUTION</td>
<td>Ammonia solution</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes. The environmentally hazardous substance mark is not required.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

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

### Additional information

**DOT Classification**
- This product is not regulated as a marine pollutant when transported on inland waterways in sizes of ≤5 L or ≤5 kg or by road, rail, or inland air in non-bulk sizes, provided the packagings meet the general provisions of §§ 173.24 and 173.24a.
- **Reportable quantity**: 1000 lbs / 454 kg [2493.4 gal / 9438.7 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

**TDG Classification**
- Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8), 2.7 (Marine pollutant mark).
- The marine pollutant mark is not required when transported by road or rail.

**IMDG**
- The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.

**IATA**
- The environmentally hazardous substance mark may appear if required by other transportation regulations.

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

**Transport in bulk according to Annex II of MARPOL and the IBC Code**
- Not available.

# Section 15. Regulatory information

**U.S. Federal regulations**
- **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined
- **Clean Water Act (CWA) 311**: ammonia; ammonia

**Clean Air Act (CAA) 112 regulated toxic substances**: ammonia

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)**
- Not listed

**Clean Air Act Section 602 Class I Substances**
- Not listed
## Section 15. Regulatory information

### Clean Air Act Section 602
- **Class II Substances**: Not listed

### DEA List I Chemicals (Precursor Chemicals)
- Not listed

### DEA List II Chemicals (Essential Chemicals)
- Not listed

### SARA 302/304

#### Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>EHS</th>
<th>SARA 302 TPQ (lbs)</th>
<th>SARA 304 RQ (lbs)</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ammonia</td>
<td>20 - 30</td>
<td>Yes.</td>
<td>500</td>
<td>100</td>
<td>1336-21-6</td>
<td>100</td>
</tr>
<tr>
<td>ammonia</td>
<td>20 - 30</td>
<td>Yes.</td>
<td>-</td>
<td>-</td>
<td>7664-41-7</td>
<td>20 - 30</td>
</tr>
</tbody>
</table>

### SARA 313

#### Form R - Reporting requirements
- ammonia (1336-21-6)
- ammonia (7664-41-7)

#### Supplier notification
- ammonia (1336-21-6)
- ammonia (7664-41-7)

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

### State regulations

#### Massachusetts
- The following components are listed: AMMONIUM HYDROXIDE; AMMONIUM WATER; AMMONIA; AMMONIA, ANHYDROUS

#### New York
- The following components are listed: Ammonium hydroxide; Ammonia

#### New Jersey
- The following components are listed: AMMONIUM HYDROXIDE; AMMONIA

#### Pennsylvania
- The following components are listed: AMMONIUM HYDROXIDE; AMMONIA

### International regulations

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

#### Montreal Protocol (Annexes A, B, C, E)
- Not listed.

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

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

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

### Inventory list

#### Australia
- All components are listed or exempted.

#### Canada
- All components are listed or exempted.

#### China
- All components are listed or exempted.

#### Europe
- All components are listed or exempted.

#### Japan
- Japan inventory (ENCS): All components are listed or exempted.
- Japan inventory (ISHL): Not determined.
Section 15. Regulatory information

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>New Zealand</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>Philippines</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>Taiwan</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Turkey</td>
<td>Not determined.</td>
</tr>
<tr>
<td>United States</td>
<td>All components are listed or exempted.</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>Not determined.</td>
</tr>
</tbody>
</table>

Section 16. Other information

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>3</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
</tr>
<tr>
<td>Physical hazards</td>
<td>0</td>
</tr>
</tbody>
</table>

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

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

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

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

**Procedure used to derive the classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKIN CORROSION - Category 1B</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)</td>
<td>Calculation method</td>
</tr>
<tr>
<td>(Respiratory tract irritation)</td>
<td></td>
</tr>
<tr>
<td>AQUATIC HAZARD (ACUTE) - Category 1</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

**History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of printing</td>
<td>2/15/2018</td>
</tr>
<tr>
<td>Date of issue/Date</td>
<td>2/15/2018</td>
</tr>
<tr>
<td>Date of revision</td>
<td></td>
</tr>
<tr>
<td>Date of previous issue</td>
<td>2/15/2018</td>
</tr>
<tr>
<td>Version</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Section 16. Other information

Key to abbreviations

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

References

- Not available.

Notice to reader

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

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
SECTION: 1. Product and company identification

1.1. Product identifier
Product form: Substance
Name: Argon, compressed
CAS No: 7440-37-1
Formula: Ar
Other means of identification: Shielding gas, argon 40

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture: Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet
Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number
Emergency number: Onsite Emergencies: 1-800-645-4633
CHEMTREC: USA 1-800-424-9300, International 001-703-527-3887 (Collect calls accepted, contract 17729)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
Classification (GHS-US): Compressed gas H280
Full text of H-phrases: see section 16

2.2. Label elements
GHS-US labeling
Hazard pictograms (GHS-US): 

Signal word (GHS-US): Warning
Hazard statements (GHS-US): H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSTA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.

Precautionary statements (GHS-US): P202 - Do not handle until all safety precautions have been read and understood
P271+P403 - Use and store only outdoors or in a well-ventilated place.
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG10 - Use only with equipment rated for cylinder pressure.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards
Other hazards not contributing to the classification: Asphyxiant in high concentrations.

2.4. Unknown acute toxicity (GHS-US)
No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

This document is only controlled while on the Praxair, Inc. website and a copy of this controlled version is available for download. Praxair cannot assure the integrity or accuracy of any version of this document after it has been downloaded or removed from our website.
**Argon, compressed**

Safety Data Sheet


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### 3.2. Mixture

Not applicable

---

**SECTION 4: First aid measures**

#### 4.1. Description of first aid measures

- **First-aid measures after inhalation**: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

- **First-aid measures after skin contact**: Adverse effects not expected from this product.

- **First-aid measures after eye contact**: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Get immediate medical attention.

- **First-aid measures after ingestion**: Ingestion is not considered a potential route of exposure.

#### 4.2. Most important symptoms and effects, both acute and delayed

No additional information available

#### 4.3. Indication of any immediate medical attention and special treatment needed

None.

---

**SECTION 5: Firefighting measures**

#### 5.1. Extinguishing media

Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.

#### 5.2. Special hazards arising from the substance or mixture

- **Reactivity**: No reactivity hazard other than the effects described in sub-sections below.

#### 5.3. Advice for firefighters

- **Firefighting instructions**: Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

- **Protection during firefighting**: Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

- **Special protective equipment for fire fighters**: Use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

- **Specific methods**: Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. Stop flow of product if safe to do so. Use water spray or fog to knock down fire fumes if possible.

---

**SECTION 6: Accidental release measures**

#### 6.1. Personal precautions, protective equipment and emergency procedures

- **General measures**: Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Evacuate area. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Stop leak if safe to do so.

#### 6.1.1. For non-emergency personnel

No additional information available

#### 6.1.2. For emergency responders

No additional information available

#### 6.2. Environmental precautions

Try to stop release.

---

10/14/2014

EN (English US)  
SDS ID: P-4563
6.3. Methods and material for containment and cleaning up
No additional information available

6.4. Reference to other sections
See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling: Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Argon, compressed (7440-37-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
</tr>
<tr>
<td>USA OSHA</td>
</tr>
</tbody>
</table>

8.2. Exposure controls
Appropriate engineering controls: Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Consider work permit system e.g. for maintenance activities.

Hand protection: Wear working gloves when handling gas containers.

Eye protection: Wear safety glasses with side shields.

Respiratory protection: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection: None necessary.

Environmental exposure controls: None necessary.
Argon, compressed
Safety Data Sheet

Other information: Wear safety shoes while handling containers.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless gas</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>40 g/mol</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>Not applicable</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (ether=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point</td>
<td>-189 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>-185.9 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>-122.4 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Critical pressure</td>
<td>4898 kPa</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity / density</td>
<td>3</td>
</tr>
<tr>
<td>Relative gas density</td>
<td>0.103 lb/ft</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: 61 mg/l</td>
</tr>
<tr>
<td>Log Pow</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Log Kow</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>None</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information

Gas group: Compressed gas
Additional information: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
None.

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7).
### 10.5. Incompatible materials

Using this product in welding and cutting may create additional hazards. The arc from electric arc welding may form gaseous reaction products such as carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other decomposition products of arc welding and cutting originate from the volatilization, reaction, and oxidization of the material being worked.

### 10.6. Hazardous decomposition products

None.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
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</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>No known effects from this product.</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general: No ecological damage caused by this product.

#### 12.2. Persistence and degradability

**Argon, compressed (7440-37-1)**

Persistence and degradability: No ecological damage caused by this product.

#### 12.3. Bioaccumulative potential

**Argon, compressed (7440-37-1)**

Log Pow: Not applicable.

Log Kow: Not applicable.

Bioaccumulative potential: No ecological damage caused by this product.

#### 12.4. Mobility in soil

**Argon, compressed (7440-37-1)**

Mobility in soil: No data available.

Ecology - soil: No ecological damage caused by this product.

#### 12.5. Other adverse effects

Effect on ozone layer: None.

Effect on the global warming: None.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste treatment methods: May be vented to atmosphere in a well ventilated place. Consult supplier for specific recommendations. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.
**Argon, compressed**  
**Safety Data Sheet**  

<table>
<thead>
<tr>
<th>Waste disposal recommendations</th>
<th>Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.</th>
</tr>
</thead>
</table>

**SECTION 14: Transport information**

In accordance with DOT

- **Transport document description**: UN1006 Argon, compressed, 2.2
- **UN-No.(DOT)**: UN1006
- **Proper Shipping Name (DOT)**: Argon, compressed
- **Department of Transportation (DOT) Hazard Classes**: 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115
- **Hazard labels (DOT)**: 2.2 - Non-flammable gas

**Additional information**

- **Emergency Response Guide (ERG) Number**: 121 (UN1006); 120 (UN1951)
- **Other information**: No supplementary information available.
- **Special transport precautions**: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
  - Ensure there is adequate ventilation.
  - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

**Transport by sea**

- **UN-No. (IMDG)**: 1006
- **Proper Shipping Name (IMDG)**: ARGON, COMPRESSED
- **Class (IMDG)**: 2 - Gases
- **MFAG-No**: 121

**Air transport**

- **UN-No.(IATA)**: 1006
- **Proper Shipping Name (IATA)**: ARGON, COMPRESSED
- **Class (IATA)**: 2
- **Civil Aeronautics Law**: Gases under pressure/Gases nonflammable nontoxic under pressure

**SECTION 15: Regulatory information**

15.1. **US Federal regulations**

- **Argon, compressed (7440-37-1)**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory
  - SARA Section 311/312 Hazard Classes: Sudden release of pressure hazard

15.2. **International regulations**

**CANADA**

- **Argon, compressed (7440-37-1)**
  - Listed on the Canadian DSL (Domestic Substances List)
  - WHMIS Classification: Class A - Compressed Gas

**EU-Regulations**

- **Argon, compressed (7440-37-1)**
  - Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Argon, compressed
Safety Data Sheet

**Classification according to Regulation (EC) No. 1272/2008 [CLP]**
Compressed gas  H280
Full text of H-phrases: see section 16

**Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]**
Not classified

15.2.2. National regulations

<table>
<thead>
<tr>
<th>Argon, compressed (7440-37-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the AICS (Australian Inventory of Chemical Substances)</td>
</tr>
<tr>
<td>Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)</td>
</tr>
<tr>
<td>Listed on the Korean ECL (Existing Chemicals List)</td>
</tr>
<tr>
<td>Listed on NZIoC (New Zealand Inventory of Chemicals)</td>
</tr>
<tr>
<td>Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)</td>
</tr>
</tbody>
</table>

15.3. US State regulations

<table>
<thead>
<tr>
<th>Argon, compressed(7440-37-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California - Proposition 65 - Carcinogens List</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State or local regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - Massachusetts - Right To Know List</td>
</tr>
<tr>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
</tr>
<tr>
<td>U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
</tbody>
</table>

**SECTION 16: Other information**

Revision date : 10/3/2014 12:00:00 AM
Other information

When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Fumes and gases produced during welding and cutting processes can be dangerous to your health and may cause serious lung disease. KEEP YOUR HEAD OUT OF FUMES. DO NOT BREATHE FUMES AND GASES. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes; or may cause other similar discomfort. Contaminants in the air may add to the hazard of fumes and gases. One such contaminant, chlorinated hydrocarbon vapors from cleaning and degreasing activities, poses a special risk. DO NOT USE ELECTRIC ARCS IN THE PRESENCE OF CHLORINATED HYDROCARBON VAPORS—HIGHLY TOXIC PHOSGENE MAY BE PRODUCED. Metal coatings such as paint, plating, or galvanizing may generate harmful fumes when heated. Residues from cleaning materials may also be harmful. AVOID ARC OPERATIONS ON PARTS WITH PHOSPHATE RESIDUES (ANTI-RUST, CLEANING PREPARATIONS)—HIGHLY TOXIC PHOSPHINE MAY BE PRODUCED.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user’s obligation to determine the conditions of safe use of the product.

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Full text of H-phrases:

<table>
<thead>
<tr>
<th>Compressed gas</th>
<th>Gases under pressure Compressed gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>H280</td>
<td>CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED</td>
</tr>
</tbody>
</table>

NFPA health hazard: 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard: 0 - Materials that will not burn.

NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

NFPA specific hazard: SA - This denotes gases which are simple asphyxiants.

HMIS III Rating

Health: 0 Minimal Hazard - No significant risk to health
Flammability: 0 Minimal Hazard
Physical: 3 Serious Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.
1. PRODUCT AND COMPANY IDENTIFICATION

Product name: BONDERITE M-CR 1200S CHROMATE COATING known as #ALODINE 1200S
IDH number: 592728

Product type: Conversion coating
Restriction of Use: None identified
Region: United States

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Contact information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER: CONTAINS FLUORIDES. MAY CAUSE DELAYED BURNS (NOT IMMEDIATELY PAINFUL OR VISIBLE)! LONG TERM EXPOSURE TO FLUORIDES OVER YEARS MAY CAUSE FLUOROSIS! MAY INTENSIFY FIRE; OXIDIZER. TOXIC IF SWALLOWED. FATAL IN CONTACT WITH SKIN OR IF INHALED CAUSES SEVERE SKIN BURNS AND EYE DAMAGE. MAY CAUSE AN ALLERGIC SKIN REACTION. MAY CAUSE ALLERGY OR ASTHMA SYMPTOMS OR BREATHING DIFFICULTIES IF INHALED. MAY CAUSE GENETIC DEFECTS. MAY CAUSE CANCER.

HAZARD CLASS | HAZARD CATEGORY
--- | ---
OXIDIZING SOLID | 2
ACUTE TOXICITY ORAL | 3
ACUTE TOXICITY INHALATION | 2
ACUTE TOXICITY DERMAL | 2
SKIN CORROSION | 1B
SERIOUS EYE DAMAGE | 1
RESPIRATORY SENSITIZATION | 1
SKIN SENSITIZATION | 1
GERM CELL MUTAGENICITY | 1B
CARCINOGENICITY | 1A

PICTOGRAM(S)

Precautionary Statements
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Do not breathe dust or fumes. Do not get in eyes, on skin, or on clothing. Wash affected area thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves, clothing, eye and face protection. [In case of inadequate ventilation] wear respiratory protection.

Response: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician. If on skin (or hair): Take off immediately all contaminated clothing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical attention. If skin irritation or rash occurs: Get medical attention. Take off contaminated clothing. In case of fire: Use foam, dry chemical or carbon dioxide to extinguish.

Storage: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

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


See Section 11 for additional toxicological information.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Component(s)</th>
<th>CAS Number</th>
<th>Percentage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium(VI) oxide</td>
<td>1333-82-0</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Potassium tetafluoroborate</td>
<td>14075-53-7</td>
<td>20 - 30</td>
</tr>
<tr>
<td>Tripotassium hexacyanoferrate</td>
<td>13746-66-2</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Sodium fluoride</td>
<td>7681-49-4</td>
<td>5 - 10</td>
</tr>
<tr>
<td>Dipotassium hexafluorozirconate</td>
<td>16923-95-8</td>
<td>5 - 10</td>
</tr>
</tbody>
</table>

* Exact percentages may vary or are trade secret. Concentration range is provided to assist users in providing appropriate protections.

### 4. FIRST AID MEASURES

**Inhalation:** If inhaled, immediately remove the affected person to fresh air. Get medical attention.

**Skin contact:** Rinse with large amounts of running water. GET MEDICAL ATTENTION IMMEDIATELY! If iced 0.13% benzalkonium chloride (Zephiran) solution or 2.5% calcium gluconate gel are available, the rinsing may be limited to 5 minutes, with the soaks or gel applied as soon as the rinsing is stopped. If benzalkonium chloride or calcium gluconate gel is not available, rinsing must continue until medical treatment is provided. Rinse with running water and soap.

**Eye contact:** In case of contact with the eyes, rinse immediately with plenty of water for 15 minutes, and seek immediate medical attention.
Ingestion: DO NOT induce vomiting unless directed to do so by medical personnel. Get immediate medical attention.

Symptoms: See Section 11.

Notes to physician: Ocular exposure to corrosive fluoride compounds has been treated with isotonic sodium chloride or magnesium chloride. Dermal exposure to corrosive fluoride compounds has been treated with calcium gluconate or calcium carbonate gel applied topically to the affected areas to relieve pain at the site of exposure. Treatment of hypocalcemia associated with corrosive fluoride compounds exposure may be corrected by intravenous calcium gluconate or calcium chloride. Treatment of hypomagnesemia may be corrected by intravenous magnesium sulfate.

5. FIRE FIGHTING MEASURES

Extinguishing media: Use media appropriate for surrounding material.

Special firefighting procedures: Wear full protective clothing. Wear self-contained breathing apparatus.

Unusual fire or explosion hazards: Oxidizing agent, may cause spontaneous ignition of combustible materials. Formation of toxic gases is possible during heating or in fires.

Hazardous combustion products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up.

Clean-up methods: Spills should be cleaned immediately to prevent dispersion of airborne dusts. Do not allow product to enter sewer or waterways. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing dust. Wash thoroughly after handling. For industrial use only.

Storage: For safe storage, store between 5 °C (41°F) and 40 °C (104°F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

<table>
<thead>
<tr>
<th>Hazardous Component(s)</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>AIHA WEEL</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium(VI) oxide</td>
<td>0.05 mg/m³ TWA (as Cr)</td>
<td>0.005 mg/m³ TWA</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0025 mg/m³</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA_ACT</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 mg/m³ Ceiling</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Potassium tetrafluoroborate</td>
<td>6 mg/m³ STEL</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Inhalable fraction</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 mg/m³ TWA</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Inhalable fraction</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Tripotassium hexacyanoferrate</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Sodium fluoride</td>
<td>2.5 mg/m³ TWA (as F)</td>
<td>2.5 mg/m³ PEL (as F)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2.5 mg/m³ TWA Dust</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Dust</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Dipotassium hexafluorozirconate</td>
<td>5 mg/m³ TWA (as Zr)</td>
<td>5 mg/m³ PEL (as Zr)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>10 mg/m³ STEL (as Zr)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Engineering controls: Ventilation should effectively remove and prevent buildup of any dust generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of dust, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Wear chemical goggles or a full face shield.

Skin protection: Chemical resistant, impermeable gloves. The use of butyl rubber gloves is recommended. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid
Color: orange
Odor: Bland
Odor threshold: Not available
pH: 1.30 - 1.60
Vapor pressure: Not determined
Boiling point/range: Not applicable
Melting point/ range: Not available
Vapor density: Not applicable
Flash point: Not applicable
Flammable/Explosive limits - lower: Not applicable
Flammable/Explosive limits - upper: Not applicable
Autoignition temperature: Not applicable
Flammability: Not applicable
Evaporation rate: Not applicable
Solubility in water: Appreciable
Partition coefficient (n-octanol/water): Not determined
VOC content: Not applicable
Viscosity: Not available
Decomposition temperature: Not available.
10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Hazardous reactions: Will not occur.

Hazardous decomposition products: May liberate hydrogen fluoride.

Incompatible materials: Avoid contact with organic materials, oils, greases, and any oxidizable materials. This product may react with strong alkalis.

Reactivity: Not available.

Conditions to avoid: Oxidizing agent, may cause spontaneous ignition of combustible materials.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion
Potential Health Effects/Symptoms

Inhalation: Inhalation of dusts of this product may cause severe irritation and burns to the respiratory tract. May cause sensitization by inhalation.

Skin contact: Contact with broken skin may lead to formation of firmly marginated "chrome sores". Product contains chromium, which may cause an allergic skin sensitization reaction. Following skin exposure to this product, the sensation of irritation or pain may be delayed.

Eye contact: This product is severely irritating to the eyes and may cause irreversible damage including burns and blindness.

Ingestion: This product may produce corrosive damage to the gastrointestinal tract if it is swallowed. Ingestion of small amounts of this product may result in potentially fatal hypocalcemia and systemic toxicity.

Hazardous Component(s) | LD50s and LC50s | Immediate and Delayed Health Effects
---|---|---
Chromium(VI) oxide | Oral LD50 (Rat) = 25 mg/kg<br>Oral LD50 (Rat) = 29 mg/kg<br>Oral LD50 (Rat) = 135 mg/kg<br>Oral LD50 (Mouse) = 80 mg/kg<br>Oral LD50 (Rat) = 80 mg/kg<br>Dermal LD50 (Rabbit) = 30 mg/kg<br>Inhalation LC50 (Rat, 4 h) = 0.087 mg/l | Allergen, Blood, Central nervous system, Corrosive, Carcinogen, Developmental, Eyes, Gastrointestinal, Irritant, Kidney, Liver, Mutagen, Reproductive, Respiratory

Potassium tetrafluoroborate | None | Cardiac, Central nervous system, Developmental, Gastrointestinal, Irritant, Kidney, Metabolic, Reproductive

Tripotassium hexacyanoferrate | None | Cellular

Sodium fluoride | Oral LD50 (Mouse) = 44.3 mg/kg<br>Oral LD50 (Mouse) = 46.0 mg/kg<br>Oral LD50 (Rat) = 32.0 mg/kg<br>Oral LD50 (Rat) = 51.6 mg/kg | Blood, Cardiac, Central nervous system, Corrosive, Gastrointestinal tract, Irritant, Kidney, Metabolic, Muscle, Teeth, Less weight gain and food intake.

Dipotassium hexafluorozirconate | Oral LD50 (Mouse) = 98 mg/kg | Allergen, Blood, Cardiac, Central nervous system, Corrosive, Gastrointestinal tract, Irritant, Kidney, Lung, Metabolic, Muscle, Teeth, Less weight gain and food intake.

12. ECOLOGICAL INFORMATION

Ecological information: Do not empty into drains / surface water / ground water.
13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: This product contains chromium which is a hazardous waste (D007). If discarded, this product is considered a RCRA ignitable waste, D001. This product, if discarded, may be characterized as a RCRA corrosive waste, D002. Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)
Proper shipping name: Chromium trioxide, anhydrous
Hazard class or division: 5.1 (6.1, 8)
Identification number: UN 1463
Packing group: II
DOT Hazardous Substance(s): Chromic acid, Sodium fluoride

International Air Transportation (ICAO/IATA)
Proper shipping name: Chromium trioxide, anhydrous
Hazard class or division: 5.1 (6.1, 8)
Identification number: UN 1463
Packing group: II

Water Transportation (IMO/IMDG)
Proper shipping name: CHROMIUM TRIOXIDE, ANHYDROUS
Hazard class or division: 5.1 (6.1, 8)
Identification number: UN 1463
Packing group: II
Marine pollutant: Chromium trioxide

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification: Chromium(VI) oxide (CAS# 1333-82-0).
CERCLA/SARA Section 302 EHS: None above reporting de minimis.
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Chromium(VI) oxide (CAS# 1333-82-0).
CERCLA Reportable quantity: Chromium(VI) oxide (CAS# 1333-82-0) 10 lbs. (4.54 kg)
Sodium fluoride (CAS# 7681-49-4) 1,000 lbs. (454 kg)
Dipotassium hexafluorozirconate (CAS# 16923-95-8) 1,000 lbs. (454 kg)
California Proposition 65: This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

IDH number: 592728
Product name: BONDERITE M-CR 1200S CHROMATE COATING known as #ALODINE 1200S

Page 7 of 8
16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: Regulatory Affairs

Issue date: 01/03/2018

DISCLAIMER: The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation and its affiliates ("Henkel") does not assume responsibility for any results obtained by persons over whose methods Henkel has no control. It is the user’s responsibility to determine the suitability of Henkel’s products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any Henkel’s products. In light of the foregoing, Henkel specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel’s products. Henkel further disclaims any liability for consequential or incidental damages of any kind, including lost profits.
SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers
Product name : Carbohydrazide
CAS-No. : 497-18-7

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Industrial & for professional use only.

1.3 Details of the supplier of the safety data sheet
Company : Central Drug House (P) Ltd
7/28 Vardaan House
New Delhi-10002
INDIA
Telephone : +91 11 49404040
Email : care@cdhfinechemical.com

1.4 Emergency telephone number
Emergency Phone # : +91 11 49404040 (9:00am - 6:00 pm) [Office hours]

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Skin sensitisation (Category 1), H317
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements
Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word : Warning
Hazard statement(s)
H302 : Harmful if swallowed.
H315 : Causes skin irritation.
Precautionary statement(s)
P273 Avoid release to the environment.
P280 Wear protective gloves.

Supplemental Hazard information (EU)
EUH044 Risk of explosion if heated under confinement.

2.3 Other hazards
Risk of explosion if heated under confinement.

SECTION 3: Composition/information on ingredients

3.1 Substances
Formula: CH$_6$N$_4$O
Molecular weight: 90.08 g/mol
CAS-No.: 497-18-7
EC-No.: 207-837-2

Hazardous ingredients according to Regulation (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonohydrazide</td>
<td>Acute Tox. 4; Skin Irrit. 2; Skin</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>497-18-7</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>207-837-2</td>
<td></td>
</tr>
<tr>
<td>Sens. 1; Aquatic Chronic 2; H302, H315, H317, H411</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)
5.3 **Advice for firefighters**
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 **Further information**
No data available

**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust. For personal protection see section 8.

6.2 **Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 **Methods and materials for containment and cleaning up**
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 **Reference to other sections**
For disposal see section 13.

**SECTION 7: Handling and storage**

7.1 **Precautions for safe handling**
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Storage class (TRGS 510): Combustible Solids

7.3 **Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

**SECTION 8: Exposure controls/personal protection**

8.1 **Control parameters**

8.2 **Exposure controls**

**Appropriate engineering controls**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal protective equipment**

**Eye/face protection**
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Body Protection**
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle r (US) or type ABEKP2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
a) Appearance
   Form: crystalline
   Colour: white
b) Odour
   Odourless
c) Odour Threshold
   No data available
d) pH
   6.7 - 8.3
e) Melting point/freezing point
   Melting point/range: 150 - 153 °C - lit.
f) Initial boiling point and boiling range
   No data available
g) Flash point
   No data available
h) Evaporation rate
   No data available
i) Flammability (solid, gas)
   No data available
j) Upper/lower flammability or explosive limits
   No data available
k) Vapour pressure
   12 mmHg at 20 °C
l) Vapour density
   No data available
m) Relative density
   1.020 g/cm3 at 20 °C
n) Water solubility
   Soluble
o) Partition coefficient: n-octanol/water
   No data available
p) Auto-ignition temperature
   No data available
q) Decomposition temperature
   No data available
r) Viscosity
   No data available
s) Explosive properties
   No data available
t) Oxidizing properties
   No data available

9.2 Other safety information
   No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
   No data available

10.2 Chemical stability
   Stable under recommended storage conditions.
10.3 **Possibility of hazardous reactions**
No data available

10.4 **Conditions to avoid**
No data available

10.5 **Incompatible materials**
Strong oxidizing agents, Strong acids, Copper, Zinc, Nickel, Lead, Brass

10.6 **Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 **Information on toxicological effects**

**Acute toxicity**
LD50 Oral - Rat - female - 311 mg/kg (Carbonohydrazide)

**Skin corrosion/irritation**
No data available (Carbonohydrazide)

**Serious eye damage/eye irritation**
No data available (Carbonohydrazide)

**Respiratory or skin sensitisation**
No data available (Carbonohydrazide)

**Germ cell mutagenicity**
No data available (Carbonohydrazide)
Result: negative
Histidine reversion (Ames)

**Carcinogenicity**
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**Reproductive toxicity**
No data available (Carbonohydrazide)

**Specific target organ toxicity - single exposure**
No data available (Carbonohydrazide)

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available (Carbonohydrazide)

**Additional Information**
RTECS: FF2625000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. (Carbonohydrazide)

SECTION 12: Ecological information

12.1 **Toxicity**

**Toxicity to fish**
LC50 - Lepomis macrochirus (Bluegill) - 190.0 mg/l - 96.0 h (Carbonohydrazide)

**Toxicity to daphnia and**
LC50 - Daphnia magna (Water flea) - 96 mg/l - 48 h (Carbonohydrazide)
other aquatic invertebrates

Toxicity to algae

EC50 - Desmodesmus subspicatus (green algae) - 9.5 mg/l - 72 h (Carbonohydrazide)

12.2 Persistence and degradability

Biodegradability Result: - Not readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available (Carbonohydrazide)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Toxic to aquatic life with long lasting effects.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Carbonohydrazide)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Carbonohydrazide)
IATA: Environmentally hazardous substance, solid, n.o.s. (Carbonohydrazide)

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: no IATA: yes

14.6 Special precautions for user

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out
SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH044 Risk of explosion if heated under confinement.
H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H411 Toxic to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Central Drug House (P) Ltd and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.cdhfinechemical.com for additional terms and conditions of sale.
SAFETY DATA SHEET
Carbon Dioxide

Section 1. Identification

GHS product identifier: Carbon Dioxide
Chemical name: Carbon dioxide
Other means of identification: Carbonic, Carbon Dioxide, Carbonic Anhydride
Product use: Synthetic/Analytical chemistry.
Synonym: Carbonic, Carbon Dioxide, Carbonic Anhydride
SDS #: 001013
Supplier’s details: Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Emergency telephone number (with hours of operation): 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture: GASES UNDER PRESSURE - Liquefied gas
Simple asphyxiant.
GHS label elements
Hazard pictograms:

Signal word: Warning
Hazard statements: Contains gas under pressure; may explode if heated.
May cause frostbite.
May displace oxygen and cause rapid suffocation.
May increase respiration and heart rate.

Precautionary statements
General: Read and follow all Safety Data Sheets (SDS’S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.
Prevention: Use and store only outdoors or in a well ventilated place.
Response: Not applicable.
Storage: Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal: Not applicable.

Date of issue/Date of revision: 10/15/2014. Date of previous issue: 9/29/2014. Version: 0.03
Carbon Dioxide

Section 2. Hazards identification

Hazards not otherwise classified: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation. May cause frostbite.

Section 3. Composition/information on ingredients

Substance/mixture: Substance
Chemical name: Carbon dioxide
Other means of identification: Carbonic, Carbon Dioxide, Carbonic Anhydride

CAS number/other identifiers
- CAS number: 124-38-9
- Product code: 001013

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

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

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

Over-exposure signs/symptoms

Eye contact: No specific data.
Inhalation: No specific data.
Skin contact: No specific data.
Section 4. First aid measures

Ingestion: No specific data.

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

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical

Decomposition products may include the following materials:

- Carbon dioxide
- Carbon monoxide

Hazardous thermal decomposition products

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

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

Special protective actions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

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

Section 6. Accidental release measures

Environmental precautions: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill: Immediately contact emergency personnel. Stop leak if without risk.

Large spill: Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
**Section 7. Handling and storage**

**Precautions for safe handling**

**Protective measures**: Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

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

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

**Section 8. Exposure controls/personal protection**

**Control parameters**

**Occasional exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>ACGIH TLV (United States, 3/2012). Oxygen Depletion [Asphyxiant].</td>
</tr>
<tr>
<td></td>
<td>STEL: 54000 mg/m³ 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>STEL: 30000 ppm 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 9000 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 5000 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 1/2013).</td>
</tr>
<tr>
<td></td>
<td>STEL: 54000 mg/m³ 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>STEL: 30000 ppm 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 9000 mg/m³ 10 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 5000 ppm 10 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 6/2010).</td>
</tr>
<tr>
<td></td>
<td>TWA: 9000 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 5000 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>STEL: 54000 mg/m³ 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>STEL: 30000 ppm 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 18000 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 10000 ppm 8 hours.</td>
</tr>
</tbody>
</table>

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

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

**Individual protection measures**

<table>
<thead>
<tr>
<th>Date of issue/Date of revision</th>
<th>Date of previous issue</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/15/2014</td>
<td>9/29/2014</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Section 8. Exposure controls/personal protection

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

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

Skin protection
Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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

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

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

Section 9. Physical and chemical properties

Appearance
Physical state: Gas. [Liquefied compressed gas.]
Color: Colorless.
Molecular weight: 44.01 g/mole
Molecular formula: C-O2
Melting/freezing point: Sublimation temperature: -79°C (-110.2 to °F)
Critical temperature: 30.85°C (87.5°F)
Odor: Odorless.
Odor threshold: Not available.
pH: Not available.
Flash point: [Product does not sustain combustion.]
Burning time: Not applicable.
Burning rate: Not applicable.
Evaporation rate: Not available.
Flammability (solid, gas): Not available.
Lower and upper explosive (flammable) limits: Not available.
Vapor pressure: 830 (psig)
Vapor density: 1.53 (Air = 1) Liquid Density@BP: Solid density = 97.5 lb/ft3 (1562 kg/m3)
Specific Volume (ft³/lb): 8.7719

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Date of previous issue: 9/29/2014.
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Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Density (lb/ft$^3$)</td>
<td>0.114</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Not available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>0.83</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>SADT</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Section 10. Stability and reactivity

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

Section 11. Toxicological information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not available</td>
</tr>
<tr>
<td>Irritation/Corrosion</td>
<td>Not available</td>
</tr>
<tr>
<td>Sensitization</td>
<td>Not available</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Not available</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not available</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not available</td>
</tr>
<tr>
<td>Teratogenicity</td>
<td>Not available</td>
</tr>
</tbody>
</table>

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Section 11. Toxicological information

Specific target organ toxicity (single exposure)
Not available.

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure

Potential acute health effects

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

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact: No specific data.
Inhalation: No specific data.
Skin contact: No specific data.
Ingestion: No specific data.

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

Short term exposure
Potential immediate effects: Not available.
Potential delayed effects: Not available.

Long term exposure
Potential immediate effects: Not available.
Potential delayed effects: Not available.

Potential chronic health effects
Not available.

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

Numerical measures of toxicity

Acute toxicity estimates
Not available.
Section 12. Ecological information

**Toxicity**
Not available.

**Persistence and degradability**
Not available.

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>0.83</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

- **Soil/water partition coefficient (K<sub>OC</sub>)**: Not available.

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

Section 13. Disposal considerations

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

Section 14. Transport information

<table>
<thead>
<tr>
<th>UN number</th>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1013</td>
<td>UN1013</td>
<td>UN1013</td>
<td>UN1013</td>
<td>UN1013</td>
<td>UN1013</td>
</tr>
</tbody>
</table>

**Transport hazard class(es)**

- 2.2

- **Packaging instruction**
- **Limited quantity**
  - **Yes.**
- **Passenger aircraft**
  - **Quantity limitation:** 75 kg
- **Cargo aircraft**

**Explosive Limit and Limited Quantity Index**
- **0.125**
- **Passenger Carrying Road or Rail Index**
  - **75**

**Passenger and Cargo Aircraft**
- **Quantity limitation:** 75 kg
- **Cargo Aircraft Only**
  - **Quantity limitation:** 150 kg

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Section 14. Transport information

| Quantity limitation: 150 kg |  |

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

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.

Section 15. Regulatory information

U.S. Federal regulations: TSCA 8(a) CDR Exempt/Partial exemption: This material is listed or exempted. United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Not listed
Clean Air Act Section 602 Class I Substances: Not listed
Clean Air Act Section 602 Class II Substances: Not listed
DEA List I Chemicals (Precursor Chemicals): Not listed
DEA List II Chemicals (Essential Chemicals): Not listed
SARA 302/304
Composition/information on ingredients

No products were found.

SARA 304 RQ: Not applicable.
SARA 311/312
Classification: Sudden release of pressure

Composition/information on ingredients

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

State regulations

Massachusetts: This material is listed.
New York: This material is not listed.
New Jersey: This material is listed.
Pennsylvania: This material is listed.
Canada inventory: This material is listed or exempted.

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Section 15. Regulatory information

International regulations

International lists

- Australia inventory (AICS): This material is listed or exempted.
- China inventory (IECSC): This material is listed or exempted.
- Japan inventory: This material is listed or exempted.
- Korea inventory: This material is listed or exempted.
- Malaysia Inventory (EHS Register): Not determined.
- New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
- Philippines inventory (PICCS): This material is listed or exempted.
- Taiwan inventory (CSNN): Not determined.

- Chemical Weapons Convention List Schedule I Chemicals: Not listed
- Chemical Weapons Convention List Schedule II Chemicals: Not listed
- Chemical Weapons Convention List Schedule III Chemicals: Not listed

Canada

- WHMIS (Canada): Class A: Compressed gas.
- CEPA Toxic substances: This material is listed.
- Canadian ARET: This material is not listed.
- Canadian NPRI: This material is not listed.
- Alberta Designated Substances: This material is not listed.
- Ontario Designated Substances: This material is not listed.
- Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements: Class A: Compressed gas.

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

<table>
<thead>
<tr>
<th>Health</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>0</td>
</tr>
<tr>
<td>Physical hazards</td>
<td>3</td>
</tr>
</tbody>
</table>

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

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

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

| Flammability | 0 |
| Health | 2 |
| Instability/Reactivity | 0 |
| Special | SA |

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Powered by IHS
## Section 16. Other information

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

### History

<table>
<thead>
<tr>
<th>Date of printing</th>
<th>10/15/2014.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of issue/Date of revision</td>
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<td>Date of previous issue</td>
<td>9/29/2014.</td>
</tr>
<tr>
<td>Version</td>
<td>0.03</td>
</tr>
</tbody>
</table>

### Key to abbreviations

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- UN = United Nations
- ACGIH – American Conference of Governmental Industrial Hygienists
- AIHA – American Industrial Hygiene Association
- CAS – Chemical Abstract Services
- CEPA – Canadian Environmental Protection Act
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
- CPR – Controlled Products Regulations
- DSL – Domestic Substances List
- GWP – Global Warming Potential
- IARC – International Agency for Research on Cancer
- ICAO – International Civil Aviation Organisation
- Inh – Inhalation
- LC – Lethal concentration
- LD – Lethal dosage
- NDSL – Non-Domestic Substances List
- NIOSH – National Institute for Occupational Safety and Health
- TDG – Canadian Transportation of Dangerous Goods Act and Regulations
- TLV – Threshold Limit Value
- TSCA – Toxic Substances Control Act
- WEEL – Workplace Environmental Exposure Level
- WHMIS – Canadian Workplace Hazardous Material Information System

### References

- Not available.

* Indicates information that has changed from previously issued version.

**Notice to reader**
Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Citric Acid
Catalog Number: 2106269

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00072
Chemical Name: 2-Hydroxy-1,2,3-Propanetricarboxylic Acid
CAS Number: 77-92-9
Additional CAS No. (for hydrated forms): -
5949-29-1, monohydrate
Chemical Formula: C₆H₈O₇
Chemical Family: Organic Acid
Intended Use: Laboratory Use

2. HAZARDS IDENTIFICATION

GHS Classification:
Hazard categories: Serious Eye Damage/Eye Irritation:Eye Irrit. 2 Skin Corrosion/Irritation: Skin Irrit. 2 .

GHS Label Elements:
WARNING

Hazard statements: . . Causes serious eye irritation. Causes skin irritation.
Not applicable
Precautionary statements: Wear protective gloves / protective clothing / eye protection / face protection. Call a POISON CENTER or doctor/physician if you feel unwell. Take off contaminated clothing and wash before reuse. Wear eye protection. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

HMI:
Health: 1
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:
Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable

WHMIS Hazard Classification: Class D, Division 2, Subdivision B - Toxic material (other toxic effects)
WHMIS Symbols: Other Toxic Effects
3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Components according to GHS:

Citric Acid

- **CAS Number:** 77-92-9
- **Chemical Formula:** C$_6$H$_8$O$_7$
- **GHS Classification:** Eye Irrit. 2 H319; Skin irrit. 2, H315
- **Percent Range:** 100.0
- **Percent Range Units:** weight / weight
- **PEL:** 15 mg/m$^3$ as total dust; 5 mg/m$^3$ as respirable dust
- **TLV:** 10 mg/m$^3$ as inhalable dust; 3 mg/m$^3$ as respirable dust
- **WHMIS Symbols:** Other Toxic Effects

4. FIRST AID MEASURES

**General Information:** In the event of exposure, show this Material Safety Data Sheet and label (where possible) to a doctor.

**Advice to doctor:** Treat symptomatically.

- **Eye Contact:** Immediately flush eyes with water for 15 minutes. Call physician.
- **Skin Contact (First Aid):** Wash skin with plenty of water. Call physician if irritation develops. Remove contaminated clothing.
- **Inhalation:** Remove to fresh air. Give artificial respiration if necessary.
- **Ingestion (First Aid):** Give large quantities of water. If you feel unwell, contact a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

- **Flammable Properties:** Can burn in fire, releasing toxic vapors. Material is not classified as flammable according to GHS criteria.
- **Fire Fighting Instruction:** As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.
- **Extinguishing Media:** Carbon dioxide  Dry chemical. Water.
- **Extinguishing Media NOT To Be Used:** Not applicable
- **Fire / Explosion Hazards:** Contact with metal nitrates may cause explosion.
- **Hazardous Combustion Products:** Toxic fumes of: carbon monoxide, carbon dioxide

6. ACCIDENTAL RELEASE MEASURES

**Spill Response Notice:**
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company’s emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

**Containment Technique:** Stop spilled material from being released to the environment. Cover spilled solid material with sand or other inert material.

**Clean-up Technique:** If permitted by regulation, Scoop up spilled material into a large beaker and dissolve with water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution. Otherwise, Pick up spill for disposal and place in a closed container Dispose of in accordance with local, state and federal regulations or laws.

**Evacuation Procedure:** Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

**DOT Emergency Response Guide Number:** Not applicable

7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes skin Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

**Storage:** Keep container tightly closed when not in use.
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:
Eye Protection: Safety glasses with top and side shields
Skin Protection: Lab coat, nitrile gloves. In the EU, the selected gloves must satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it.
Inhalation Protection: Adequate ventilation

Precautionary Measures: Avoid contact with: eyes, skin. Do not breathe: dust. Wash thoroughly after handling.

TLV: 10 mg/m³ as inhalable dust; 3 mg/m³ as respirable dust
PEL: 15 mg/m³ as total dust; 5 mg/m³ as respirable dust

For Occupational Exposure Limits (OEL) for ingredients, see section 3 - Composition/Information on Ingredients.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White crystals
Physical State: Solid
Molecular Weight: 192
Odor: Odorless
Odor Threshold: Not applicable
pH: 2 (1% solution)
Metal Corrosivity:
Corrosivity Classification: Not classified as corrosive to metals according to GHS criteria.
Steel: Not Applicable
Aluminum: Not Applicable

Specific Gravity/ Relative Density (water = 1; air =1): 1.67
Viscosity: Not applicable
Solubility:
Water: 750 g/L
Acid: Soluble
Other: Soluble in ethanol and methanol. Insoluble in chloroform and benzene.

Partition Coefficient (n-octanol / water): -1.64
Coefficient of Water / Oil: Not available
Melting Point: 153 °C (307 °F)
Decomposition Temperature: 175 °C (347 °F)

Boiling Point: Not applicable
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Evaporation Rate (water = 1): Not applicable
Volatile Organic Compounds Content: Not applicable

Flammable Properties: Can burn in fire, releasing toxic vapors. Material is not classified as flammable according to GHS criteria.
Flash Point: Not applicable
Method: Not applicable

Flammability Limits:
Lower Explosion Limits:
Upper Explosion Limits:
Autoignition Temperature: 540 °C (1004 °F)

Explosive Properties:
Not classified according to GHS criteria.

Oxidizing Properties:
Not classified according to GHS criteria.

Reactivity Properties:
Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.
Gas under Pressure:
Not classified according to GHS criteria.

10. STABILITY AND REACTIVITY
**Chemical Stability:** Stable when stored under proper conditions.

**Mechanical Impact:** None reported.

**Static Discharge:** None reported.

**Reactivity / Incompatibility:** May explode in contact with: metal nitrates

**Hazardous Decomposition:** Heating to decomposition releases toxic fumes of carbon monoxide and carbon dioxide.

**Conditions to Avoid:** Excess moisture

---

### 11. TOXICOLOGICAL INFORMATION

**Toxicokinetics, Metabolism and Distribution:**
Important metabolite of Krebs cycle. Chronic exposure may cause effects due to its ability to chelate metals, which could impair body's ability to absorb Ca and Fe.

**Toxicologically Synergistic Products:** None reported

**Acute Toxicity:** Toxicological Testing Route Data Given Below Based on classification principles, the classification criteria are not met. Generally Recognized as Safe (GRAS) designation by US Food and Drug Administration

- Oral Rat LD50 = 3000 mg/kg
- Dermal Rat LD50 > 2000 mg/kg

**Specific Target Organ Toxicity - Single Exposure (STOT-SE):** Data insufficient for classification

- Inhalation Rat TDLo = 0.180 mg/L - Impaired liver and biochemical changes.

**Specific Target Organ Toxicity - Repeat Exposure (STOT-RE):** Data insufficient for classification

- Oral Rat TDLo 9300 mg/kg/15 days - Biochemical changes and changes in blood serum composition. Inhalation Rat TDLo = 0.180 mg/L - Impaired liver and biochemical changes.

**Skin Corrosion/Irritation:** Irritating to skin.

- Skin - Rabbit - 500 mg/24 hr - Moderate irritation.

**Eye Damage:** Irritating to eyes.

**Sensitization:** Based on classification principles, the classification criteria are not met.

**CMR Effects/Properties (carcinogenic, mutagenic or toxic to reproduction):** No germ cell mutagenicity, carcinogenicity or reproductive toxicity data found. Based on classification principles, the classification criteria are not met.

- IARC Listed: No
- NTP Listed: No
- O.S.H.A. Listed: No

**Symptoms/Effects:**

- **Ingestion:** May be harmful if swallowed. Large doses may cause: gastrointestinal tract irritation abdominal pain vomiting
- **Inhalation:** No effects anticipated. Large doses may cause: respiratory tract irritation
- **Skin Absorption:** May be harmful if absorbed through skin.
- **Chronic Effects:** Citric acid chronic overexposure may cause effects due to the ability of citric acid to chelate metals, which could impair the body's ability to absorb calcium and iron.

**Medical Conditions Aggravated:** Pre-existing: Eye conditions Skin conditions Respiratory conditions

---

### 12. ECOLOGICAL INFORMATION

**Product Ecological Information:** 96 hr Lepomis macrochirus LC50 = 1516 mg/L; 72 hr Daphnia magna LC50 = 120mg/L; LC50 48 hr Leuciscus idus melanotus LC50 = 440 mg/L; 48 hr Crustaceans LC50 = 160 mg/L.

Based on classification principles, not classified as hazardous to the environment. Mobility in soil: Highly mobile. No bioaccumulation potential. Rapidly biodegradable.

**CEPA Categorization:** Not Persistent or Bioaccumulative. Not inherently toxic to aquatic organisms.

**Ingredient Ecological Information:** --

Not applicable

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### 13. DISPOSAL CONSIDERATIONS

**EPA Waste ID Number:** Not applicable

**Special Instructions (Disposal):** Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. If permitted by regulation. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system. Otherwise, Check with national, local municipal and state authorities and waste contractors for pertinent local information on the disposal of this article.

**Empty Containers:** Rinse three times with an appropriate solvent. Collect rinsate and dispose of according to local, state or federal regulations. In the US, rinsate from empty containers is classified as hazardous waste and should be disposed of at
an E.P. A. approved facility. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste.

**NOTICE (Disposal):** These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information. In Europe: Chemical and analysis solutions must be disposed of in compliance with the respective national regulations. Product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system.

14. TRANSPORT INFORMATION

**D.O.T.:**

- **D.O.T. Proper Shipping Name:** Not Currently Regulated
- **Hazard Class:** NA
- **Subsidiary Risk:** NA
- **ID Number:** NA
- **Packing Group:** NA

**T.D.G.:**

- **Proper Shipping Name:** Not Currently Regulated
- **Hazard Class:** NA
- **Subsidiary Risk:** NA
- **UN Number/PIN:** NA
- **Packing Group:** NA

**I.C.A.O.:**

- **I.C.A.O. Proper Shipping Name:** Not Currently Regulated
- **Hazard Class:** NA
- **Subsidiary Risk:** NA
- **ID Number:** NA
- **Packing Group:** NA

**I.M.O.:**

- **Proper Shipping Name:** Not Currently Regulated
- **Hazard Class:** NA
- **Subsidiary Risk:** NA
- **ID Number:** NA
- **Packing Group:** NA

**Additional Information:** There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

**U.S. Federal Regulations:**

- **O.S.H.A.:** This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

- **E.P.A.:**
  - **S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370):** Immediate (Acute) Health Hazard
  - **S.A.R.A. Title III Section 313 (40 CFR 372):** This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.
  - 302 (EHS) TPQ (40 CFR 355): Not applicable
  - 304 CERCLA RQ (40 CFR 302.4): Not applicable
  - 304 EHS RQ (40 CFR 355): Not applicable
  - **Clean Water Act (40 CFR 116.4):** Not applicable
  - **RCRA:** Contains no RCRA regulated substances.

**State Regulations:**

- **California Prop. 65:** No Prop. 65 listed chemicals are present in this product.
- **Identification of Prop. 65 Ingredient(s):** None
- **California Perchlorate Rule CCR Title 22 Chap 33:** Not applicable
Trade Secret Registry: Not applicable

National Inventories:
- **U.S. Inventory Status**: TSCA Listed: Yes
- **CAS Number**: 77-92-9
- **Canadian Inventory Status**: DSL Listed: Yes
- **EEC Inventory Status**: EINECS Listed: Yes
- **Australian Inventory (AICS) Status**: Listed
- **New Zealand Inventory (NZIoC) Status**: Listed
- **Japanese Inventory (KECI) Status**: Listed
- **Japan (ENCS) Inventory Status**: Listed
- **Chinese (PRC) Inventory (MEP) Status**: Listed

16. OTHER INFORMATION


**Complete Text of H phrases referred to in Section 3**: H319 Causes serious eye irritation. H315 Causes skin irritation.

**Revision Summary**: Substantial revision to comply with EU Reg 1272/2008, Reg 1907/2006 and UN GHS (ST/SG/AC.10/36/Add.3).

**Date of MSDS Preparation**:
- **Day**: 28
- **Month**: May
- **Year**: 2014

**MSDS Prepared**: MSDS prepared by Product Compliance Department extension 3350

**CCOHS Evaluation Note**: It is offered under the interim policy that was established by Health Canada permitting use of GHS-formatted safety data sheets in Canada prior to revision of CPR to GHS. It is offered under exemption from WHMIS labeling as specified in the Controlled Products Regulation (CPR) Section 17. This product has been classified and labeled in accordance with the requirements of GHS (ST/SG/AC.10/36/Add.3).

Legend:
- **NA** - Not Applicable
- **ND** - Not Determined
- **NV** - Not Available
- **w/w** - weight/weight
- **w/v** - weight/volume
- **v/v** - volume/volume

**USER RESPONSIBILITY**: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

HACH COMPANY ©2015
# Material Safety Data Sheet

## Diesel Exhaust Fluid / AdBlue®

### 1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Diesel Exhaust Fluid / AdBlue®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier/Manufacturer</td>
<td>Krueg North America, Inc. 3511 Silverside Rd., Concord Plaza, Suite 200, Wilmington, Delaware, 19810 USA Tel +1 302 477 6668 Fax +1 302 477 9494</td>
</tr>
<tr>
<td>Material uses</td>
<td>Other non-specifics industry; Cleaning of waste gases</td>
</tr>
<tr>
<td>Validation date</td>
<td>25.08.2009</td>
</tr>
<tr>
<td>Responsible name</td>
<td>Chemical Check GmbH</td>
</tr>
<tr>
<td>Email address of person responsible for this SDS</td>
<td><a href="mailto:info@chemical-check.de">info@chemical-check.de</a>, <a href="mailto:k.schnurtuschi@chemical-check.de">k.schnurtuschi@chemical-check.de</a></td>
</tr>
<tr>
<td>In case of emergency</td>
<td>For Chemical Emergency: Spill, Leak, Fire, Exposure or Accident. Call CHEMTREC Day or Night: DOMESTIC NORTH AMERICA: 800-424-9300 INTERNATIONAL: CALL 703-527-3867 (collect calls accepted)</td>
</tr>
<tr>
<td>Product type</td>
<td>Liquid</td>
</tr>
</tbody>
</table>

### 2. Hazards identification

#### Emergency overview
- **Color**: Colorless, Yellowish
- **Physical state**: Liquid
- **Odor**: Characteristic
- **Hazard statements**: MAY CAUSE RESPIRATORY TRACT EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

#### OSHA/HCS status
- The material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

#### Routes of entry
- Dermal contact, Eye contact, Inhalation.

#### Potential acute health effects
- **Inhalation**: Slightly irritating to the eyes, skin and respiratory system. Avoid breathing vapor or mist. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
- **Ingestion**: No known significant effects or critical hazards.
- **Skin**: Slightly irritating to the skin.
- **Eyes**: Slightly irritating to the eyes.

#### Potential chronic health effects
- **Chronic effects**: Contains material that may cause target organ damage, based on animal data.
- **Carcinogenicity**: No known significant effects or critical hazards.
- **Mutagenicity**: No known significant effects or critical hazards.
- **Teratogenicity**: No known significant effects or critical hazards.
- **Developmental effects**: No known significant effects or critical hazards.
- **Fertility effects**: No known significant effects or critical hazards.
- **Target organ**: Contains material which may cause damage to the following organs: skin, eyes.

#### Over-exposure signs/symptoms
- **Inhalation**: Adverse symptoms may include the following: respiratory tract irritation, coughing.
- **Ingestion**: No specific data.

---

25.08.2008
2. Hazards identification

<table>
<thead>
<tr>
<th>Skin</th>
<th>Adverse symptoms may include the following: irritation, redness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Adverse symptoms may include the following: irritation, watering, redness</td>
</tr>
<tr>
<td>Medical conditions aggravated by over-exposure</td>
<td>Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product</td>
</tr>
</tbody>
</table>

See toxicological information (section 11)

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>57-13-8</td>
<td>15-40</td>
</tr>
</tbody>
</table>

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

4. First aid measures

| Eye contact | Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately |
| Skin contact | In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately |
| Inhalation | Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately |
| Ingestion | Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately |
| Protection of first-aiders | No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation |
| Notes to physician | In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours |

5. Fire-fighting measures

| Flammability of the product | In a fire or if heated, a pressure increase will occur and the container may burst |
| Extinguishing media Suitable | Use an extinguishing agent suitable for the surrounding fire |
| Not suitable | None known |
| Special exposure hazards | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training |
| Hazardous thermal decomposition products | Decomposition products may include the following materials: carbon dioxide, carbon monoxide, nitrogen oxides, Ammonia |
| Special protective equipment for fire-fighters | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode |
6. Accidental release measures

Personal precautions: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewage, waterways, spill or air).

Methods for cleaning up

Small spill: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling: Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage: Store between the following temperatures: -5 to 30°C (23 to 86°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>AIHA WEEL (United States, 1/2009). TWA: 10 mg/m³ 8 hour(s).</td>
</tr>
</tbody>
</table>

Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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

Personal protection.
8. **Exposure controls/personal protection**

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

**Hands**
- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time), natural rubber (latex)

**Eyes**
- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

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

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

---

9. **Physical and chemical properties**

**Physical state**
- Liquid

**Flash point**
- Closed cup: Not applicable

**Color**
- Colorless/Yellowish

**Odor**
- Characteristic

**pH**
- 10 (Conc. 9% w/w), 10%

**Boiling/condensation point**
- 103°C (217°F)

**Melting/freezing point**
- -11°C (12.2°F)

**Density**
- 1.087 to 1.093 g/cm³ (20°C (68°F))

**Viscosity**
- Dynamic 0.14 mPa s (0.14 cp)

---

10. **Stability and reactivity**

**Chemical stability**
- The product is stable

**Conditions to avoid**
- Store and use away from heat, sparks, open flame or any other ignition source.

**Materials to avoid**
- Reactive or incompatible with the following materials: oxidizing materials, highly reactive with water.

**Hazardous decomposition products**
- Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Possibility of hazardous reactions**
- Under normal conditions of storage and use, hazardous reactions will not occur.

---

11. **Toxicological information**

**Potential acute health effects**

**Inhalation**
- Slightly irritating to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

**Ingestion**
- No known significant effects or clinical hazards.

**Eyes**
- Slightly irritating to the eyes.

**Skin**
- Slightly irritating to the skin.

**Acute toxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Route</th>
<th>Exposure</th>
</tr>
</thead>
</table>

---

**11. Toxicological information**

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>LD50 Oral</th>
<th>LD50 Intranasal</th>
<th>LD50 Intratracheal</th>
<th>LD50 Intravenous</th>
<th>Subcoelomic</th>
<th>Toxicological information</th>
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</thead>
<tbody>
<tr>
<td>Rat</td>
<td>&gt;5 g/kg</td>
<td>687 mg/kg</td>
<td>5300 mg/kg</td>
<td>5300 mg/kg</td>
<td>8200 mg/kg</td>
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<td></td>
</tr>
</tbody>
</table>

**12. Ecological information**

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic ecotoxicity</td>
<td>Urea</td>
<td>Acute EC50 5573</td>
<td>mg/L Fresh water</td>
<td>Daphnia - Water flea</td>
<td>&lt;24 hours</td>
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<tr>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>Ceriodaphnia dubia - Neomysis</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;24 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Copepoda - Amphipod</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chaetogammarus mansoni</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Young - 5 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Rohu - Labeo rohita</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FRY - 0.6 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Rohu - Labeo rohita</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Rohu - Labeo rohita</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Rohu - Labeo rohita</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Mozambique tilapia</td>
<td>95 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tilapia mossambica</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fish - Giana gourami</td>
<td>95 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gria gourami - Colisa</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td></td>
</tr>
</tbody>
</table>

**13. Disposal considerations**

**Waste disposal**

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional/local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
### 13. Disposal considerations

Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

### 14. Transport information

DOT/IMDG/ATA: Not regulated.

### 15. Regulatory information

<table>
<thead>
<tr>
<th>HCS Classification</th>
<th>Target organ effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Federal regulations</td>
<td>United States Inventory (TSCA 8a) All components are listed or exempted</td>
</tr>
<tr>
<td></td>
<td>SARA 302/304/311/312 extremely hazardous substances: No products were found.</td>
</tr>
<tr>
<td></td>
<td>SARA 302/304 emergency planning and notification: No products were found.</td>
</tr>
<tr>
<td></td>
<td>SARA 302/304/311/312 hazardous chemicals. Urea</td>
</tr>
<tr>
<td></td>
<td>SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Urea immediate (acute) health hazard, Delayed (chronic) health hazard</td>
</tr>
<tr>
<td></td>
<td>Clean Water Act (CWA) 307: No products were found</td>
</tr>
<tr>
<td></td>
<td>Clean Water Act (CWA) 311: No products were found</td>
</tr>
<tr>
<td></td>
<td>Clean Air Act (CAA) 112 accidental release prevention: No products were found</td>
</tr>
<tr>
<td></td>
<td>Clean Air Act (CAA) 112 regulated flammable substances: No products were found</td>
</tr>
<tr>
<td></td>
<td>Clean Air Act (CAA) 112 regulated toxic substances: No products were found</td>
</tr>
</tbody>
</table>

| Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) |
| Clean Air Act Section 602 Class I Substances |
| Clean Air Act Section 602 Class II Substances |
| DEA List I Chemicals (Precursor Chemicals) |
| DEA List II Chemicals (Essential Chemicals) |

| State regulations |
| Connecticut Carcinogen Reporting: None of the components are listed |
| Connecticut Hazardous Material Survey: None of the components are listed |
| Florida substances: None of the components are listed |
| Illinois Chemical Safety Act: None of the components are listed |
| Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed |
| Louisiana Reporting: None of the components are listed |
| Louisiana Spill: None of the components are listed |
| Massachusetts Spill: None of the components are listed |
| Massachusetts Substances: None of the components are listed |
| Michigan Critical Material: None of the components are listed |
| Minnesota Hazardous Substances: None of the components are listed |
| New Jersey Hazardous Substances: None of the components are listed |
| New Jersey Spill: None of the components are listed |
| New Jersey Toxic Catastrophe Prevention Act: None of the components are listed |
| New York Acutely Hazardous Substances: None of the components are listed |
| New York Toxic Chemical Release Reporting: None of the components are listed |
| Pennsylvania RTK Hazardous Substances: None of the components are listed |
| Rhode Island Hazardous Substances: None of the components are listed |

**United States Inventory (TSCA 8a)**: All components are listed or exempted.

**International regulations**: None of the components are listed.
Diesel Exhaust Fluid / AdBlue®

15. Regulatory information

International lists:
- Australia Inventory (AIICS): All components are listed or exempted.
- China Inventory (IECSC): All components are listed or exempted.
- Japan Inventory: All components are listed or exempted.
- Korea Inventory: All components are listed or exempted.
- New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
- Philippines Inventory (PICCS): All components are listed or exempted.
- Vietnamese Inventory: All components are listed or exempted.

Chemical Weapons
- Convention List Schedule I Chemicals: Not listed
- Convention List Schedule II Chemicals: Not listed
- Convention List Schedule III Chemicals: Not listed

16. Other information

Label requirements:
- MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

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

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6688.

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

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

Date of issue: 25.06.2009
Date of previous issue: No previous validation
Version: 1

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

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Diesel Low Sulfur (LSD) and Ultra Low Sulfur Diesel (ULSD)

Synonyms: CARB Diesel, 888100004478

MSDS Number: 888100004478

Product Use Description: For Tesoro Refining & Marketing Co.

Company: For Tesoro Refining & Marketing Co.

19100 Ridgewood Parkway, San Antonio, TX 78259

Tesoro Call Center: (877) 783-7676

Chemtrec: (Emergency Contact) (800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classifications:
- Flammable Liquid – Category 3
- Skin Irritation – Category 2
- Eye Irritation – Category 2B
- Aspiration Hazard – Category 1
- Carcinogenicity – Category 2
- Acute Toxicity - Inhalation – Category 4
- Chronic Aquatic Toxicity – Category 2

Pictograms:

Signal Word: Danger

Hazard Statements:
- Flammable liquid and vapor.
- May be fatal if swallowed and enters airways – do not siphon diesel by mouth.
- Causes skin irritation.
- Causes eye irritation.
- Suspected of causing skin cancer if repeated and prolonged skin contact occurs.
- Suspected of causing cancer in the respiratory system if repeated and prolonged over-exposure by inhalation occurs.
- May cause damage to liver, kidneys and nervous system by repeated and prolonged inhalation.
Precautionary statements

Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, sparks, open flames, welding and hot surfaces.
No smoking.
Keep container tightly closed.
Ground and/or bond container and receiving equipment.
Use explosion-proof electrical equipment.
Use only non-sparking tools if tools are used in flammable atmosphere.
Take precautionary measures against static discharge.
Wear gloves, eye protection and face protection as needed to prevent skin and eye contact with liquid.
Wash hands or liquid-contacted skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid breathing vapors or mists.
Use only outdoors or in a well-ventilated area.

Response
In case of fire: Use dry chemical, CO2, water spray or fire fighting foam to extinguish.
If swallowed: Immediately call a poison center, doctor, hospital emergency room, medical clinic or 911. Do NOT induce vomiting. Rinse mouth.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
If in eye: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If skin or eye irritation persists, get medical attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call or doctor or emergency medical provider. See Section 4 and Section 11 for medical treatment information.

Storage
Store in a well ventilated place. Keep cool. Store locked up. Keep container tightly closed. Use only approved containers.

Disposal
Dispose of contents/containers to approved disposal site in accordance with local, regional, national, and/or international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels, diesel, No 2; Gasoil - unspecified</td>
<td>68478-34-6</td>
<td>100%</td>
</tr>
<tr>
<td>Nonane</td>
<td>111-84-2</td>
<td>0 - 5%</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>0 - 1%</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET  
1,2,4-Trimethylbenzene  
Xylene  
Sulfur  

<table>
<thead>
<tr>
<th>1,2,4-Trimethylbenzene</th>
<th>95-63-6</th>
<th>0 - 2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylene</td>
<td>1330-20-7</td>
<td>0 - 2%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>7704-34-9</td>
<td>15 ppm maximum</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

Inhalation : Move to fresh air. Give oxygen. If breathing is irregular or stopped, administer artificial respiration. Seek medical attention immediately.

Skin contact : Take off all contaminated clothing immediately. Wash off immediately with soap and plenty of water. Wash contaminated clothing before re-use. If skin irritation persists, seek medical attention immediately.

Eye contact : Remove contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes. If symptoms persist, seek medical attention.

Ingestion : Do not induce vomiting without medical advice. If a person vomits when lying on his back, place him in the recovery position. Seek medical attention immediately.


SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray or fire fighting foam. LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers. Keep containers and surroundings cool with water spray.

Specific hazards during fire fighting : Fire Hazard Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus and protective suit. Use personal protective equipment.

Further information : Exposure to decomposition products may be a hazard to health. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned nozzle holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact. Ensure adequate ventilation. Use personal protective equipment.
Environmental precautions: Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection. Discharge into the environment must be avoided. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up: Take up with sand or oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution. Flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling: Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initiated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

1. Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
2. Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha).
3. Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initiated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Conditions for safe storage, including incompatibilities: Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION
Exposure Guidelines

<table>
<thead>
<tr>
<th>List</th>
<th>Components</th>
<th>CAS-No.</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA Z1</td>
<td>Xylene</td>
<td>1330-20-7</td>
<td>PEL</td>
<td>100 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>435 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>PEL</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50 mg/m³</td>
</tr>
<tr>
<td>ACGIH</td>
<td>Diesel Fuel</td>
<td>68475-30-2</td>
<td>TWA</td>
<td>100 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Xylene</td>
<td>1330-20-7</td>
<td>TWA</td>
<td>100 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STEL</td>
<td>150 ppm</td>
</tr>
<tr>
<td></td>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 ppm</td>
</tr>
<tr>
<td></td>
<td>Nonane</td>
<td>111-84-2</td>
<td>TWA</td>
<td>200 ppm</td>
</tr>
</tbody>
</table>

Engineering measures: Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use only intrinsically safe electrical equipment approved for use in classified areas.

Eye protection: Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Hand protection: Gloves constructed of nitrile, neoprene, or PVC are recommended. Consult manufacturer specifications for further information.

Skin and body protection: If needed to prevent skin contact, chemical protective clothing such as of DuPont TyChem®, Saranex or equivalent recommended based on degree of exposure. The resistance of specific material may vary from product to product as well as with degree of exposure.

Respiratory protection: A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a NIOSH/MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Work / Hygiene practices: Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
SAFETY DATA SHEET

**Diesel Low Sulfur (LSD) and Ultra Low Sulfur Diesel (ULSD)**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear to straw colored liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Characteristic petroleum or kerosene-like odor</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>0.1 - 1 ppm typically reported</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Gel point can be about -15°F; freezing requires laboratory conditions</td>
</tr>
<tr>
<td>Initial boiling point &amp; range</td>
<td>154 - 372 °C (310° - 702 °F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>38°C Minimum for #1 Diesel, 52°C Minimum for #2 Diesel</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Higher initially and declining as lighter components evaporate</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Flammable vapor released by liquid</td>
</tr>
<tr>
<td>Upper explosive limit</td>
<td>6.5 % (V)</td>
</tr>
<tr>
<td>Lower explosive limit</td>
<td>0.6 % (V)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&lt; 2 mm Hg at 20 °C</td>
</tr>
<tr>
<td>Vapor density (air = 1)</td>
<td>&gt; 4.5</td>
</tr>
<tr>
<td>Relative density (water = 1)</td>
<td>0.86 g/mL</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>0.0005 g/100 mL</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>&gt; 3.3 as log Pow</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>257 °C (495 °F)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Will evaporate or boil and possibly ignite before decomposition occurs.</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>1 to 6 mm²/s range reported for No.1 or No.2 diesel at ambient temperatures</td>
</tr>
<tr>
<td>Conductivity</td>
<td>Diesel Fuel Oils at terminal load rack: At least 25 pS/m</td>
</tr>
<tr>
<td>(conductivity can be reduced)</td>
<td>Ultra Low Sulfur Diesel (ULSD) without conductivity additive: 0 pS/m to 5 pS/m</td>
</tr>
<tr>
<td>by environmental factors such</td>
<td>ULSD at terminal load rack with conductivity additive: At least 50 pS/m</td>
</tr>
<tr>
<td>as a decrease in temperature</td>
<td>JP-8 at terminal load rack:</td>
</tr>
<tr>
<td></td>
<td>150 pS/m to 600 pS/m</td>
</tr>
</tbody>
</table>

**SECTION 10. STABILITY AND REACTIVITY**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>Vapors may form explosive mixture with air. Hazardous polymerization does not occur.</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>Stable under normal conditions.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Can react with strong oxidizing agents, peroxides, acids and alkalies. Do not use with Viton or Fluorel gaskets or seals.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Avoid static charge accumulation and discharge (see Section 7).</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Ignition and burning can release carbon monoxide, carbon dioxide, non-combusted hydrocarbons (smoke) and, depending on formulation, trace amounts</td>
</tr>
</tbody>
</table>
of sulfur dioxide. Diesel exhaust particulates may be a lung hazard (see Section 11).

### SECTION 11. TOXICOLOGICAL INFORMATION

| Inhalation | Vapors or mists from this material can irritate the nose, throat, and lungs, and can cause signs and symptoms of central nervous system depression, depending on the concentration and duration of exposure. |
| Skin contact | Skin irritation leading to dermatitis may occur upon prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed. Long-term, repeated skin contact may cause skin cancer. |
| Eye contact | Eye irritation may result from contact with liquid, mists, and/or vapors. |
| Ingestion | Harmful or fatal if swallowed. Do NOT induce vomiting. This material can irritate the mouth, throat, stomach, and cause nausea, vomiting, diarrhea and restlessness. Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death. |
| Target organs | Central nervous system, Eyes, Skin, Kidney, Liver |
| Further information | Studies have shown that similar products produce skin cancer or skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation. Repeated over-exposure may cause liver and kidney injury. IARC classifies whole diesel fuel exhaust particulates as carcinogenic to humans (Group 1). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans. |

### Component:

<p>| Fuels, diesel, No 2; Gasoil - unspecified | 68476-34-6 | Acute oral toxicity: LD50 rat&lt;br&gt;Dose: 5,001 mg/kg&lt;br&gt;Acute dermal toxicity: LD50 rabbit&lt;br&gt;Dose: 2,001 mg/kg&lt;br&gt;Acute inhalation toxicity: LC50 rat&lt;br&gt;Dose: 7.64 mg/L&lt;br&gt;Exposure time: 4 h&lt;br&gt;Skin irritation, Classification: Irritating to skin. Result: Severe skin irritation&lt;br&gt;Eye irritation, Classification: Irritating to eyes. Result: Mild eye irritation |
| Nonane | 111-84-2 | Acute oral toxicity: LD50 mouse&lt;br&gt;Dose: 218 mg/kg&lt;br&gt;Acute inhalation toxicity: LC50 rat&lt;br&gt;Exposure time: 4 h |
| Naphthalene | 91-20-3 | Acute oral toxicity: LD50 rat&lt;br&gt;Dose: 2,001 mg/kg&lt;br&gt;Acute dermal toxicity: LD50 rat&lt;br&gt;Dose: 2,501 mg/kg |</p>
<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS No.</th>
<th>Acute Inhalation Toxicity: LC50 (mg/L)</th>
<th>Exposure Time: 4 h</th>
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</thead>
<tbody>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>95-63-6</td>
<td>18</td>
<td>4 h</td>
</tr>
<tr>
<td>Xylene</td>
<td>1330-20-7</td>
<td>2,840</td>
<td>4 h</td>
</tr>
</tbody>
</table>

**Carcinogenicity**

- **NTP**
  - Naphthalene (CAS-No.: 91-20-3)

- **IARC**
  - Naphthalene (CAS-No.: 91-20-3)

- **OSHA**
  - No component of this product which is present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

- **CA Prop 65**
  - WARNING! This product contains a chemical known to the State of California to cause cancer. Naphthalene (CAS-No.: 91-20-3)

**SECTION 12. ECOLOGICAL INFORMATION**

- **Component:** Diesel (CAS-No.: 68476-34-6)
  - **Toxicity to Fish:** LC50
    - Species: Jordanella floridæ
    - Dose: 54 mg/L

**Additional ecological information:** Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.
Exposure time: 96 h

Toxicity to crustacea:
Species: Palaemonetes pugio
TLm (48 hour) = 3.4 mg/l

### SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal:** Dispose of container and unused contents in accordance with federal, state and local requirements.

### SECTION 14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th><strong>CFR</strong></th>
<th></th>
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<tr>
<td>Proper shipping name</td>
<td>DIESEL FUEL</td>
</tr>
<tr>
<td>UN-No.</td>
<td>UN1202 (NA 1993)</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
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</table>

<table>
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<tr>
<td>UN-No.</td>
<td>UN1202 (NA 1993)</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>IATA Cargo Transport</strong></th>
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<tbody>
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<td>UN UN-No.</td>
<td>UN1202 (NA 1993)</td>
</tr>
<tr>
<td>Description of the goods</td>
<td>DIESEL FUEL</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Packaging group</td>
<td>III</td>
</tr>
<tr>
<td>ICAO-Labels</td>
<td>3</td>
</tr>
<tr>
<td>Packing instruction (cargo aircraft)</td>
<td>366</td>
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<td>Packing instruction (cargo aircraft)</td>
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</table>

<table>
<thead>
<tr>
<th><strong>IATA Passenger Transport</strong></th>
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<td>UN1202 (NA 1993)</td>
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<tr>
<td>Description of the goods</td>
<td>DIESEL FUEL</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
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<tr>
<td>Packaging group</td>
<td>III</td>
</tr>
<tr>
<td>ICAO-Labels</td>
<td>3</td>
</tr>
<tr>
<td>Packing instruction (passenger aircraft)</td>
<td>355</td>
</tr>
<tr>
<td>Packing instruction (passenger aircraft)</td>
<td>Y344</td>
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</table>

<table>
<thead>
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<th><strong>IMDG-Code</strong></th>
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<tbody>
<tr>
<td>UN-No.</td>
<td>UN 1202 (NA 1993)</td>
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<td>Description of the goods</td>
<td>DIESEL FUEL</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Packaging group</td>
<td>III</td>
</tr>
<tr>
<td>IMDG-Labels</td>
<td>3</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Diesel Low Sulfur (LSD) and Ultra Low Sulfur Diesel (ULSD)

SECTION 15. REGULATORY INFORMATION

- CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)
  The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

- TSCA Status: On TSCA Inventory
- DSL Status: All components of this product are on the Canadian DSL list
- SARA 311/312 Hazards: Fire Hazard, Acute Health Hazard, Chronic Health Hazard

SARA III
US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

Components | CAS-No.
--- | ---
Xylene | 1330-20-7
1,2,4-Trimethylbenzene | 95-63-6
Naphthalene | 91-20-3

PENN RTK
US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Components | CAS-No.
--- | ---
Nonane | 111-84-2
Naphthalene | 91-20-3
1,2,4-Trimethylbenzene | 95-63-6
xylene | 1330-20-7
Fuels, diesel, No 2; Gasoil - unspecified | 68476-34-6

MASS RTK
US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Components | CAS-No.
--- | ---
Xylene | 1330-20-7
1,2,4-Trimethylbenzene | 95-63-6
Naphthalene | 91-20-3
Nonane | 111-84-2

NJ RTK
US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Components | CAS-No.
--- | ---
Nonane | 111-84-2
SAFETY DATA SHEET

Naphthalene 91-20-3
1,2,4-Trimethylbenzene 95-63-6
Xylene 1330-20-7
Fuels, diesel, No 2; Gasoil - unspecified 68476-34-6

California Prop. 65
WARNING! This product contains a chemical known to the State of California to cause cancer.
Naphthalene 91-20-3

SECTION 16. OTHER INFORMATION

Further information
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

10/29/2012

1153, 1250, 1443, 1454, 1814, 1815, 1866, 1925
## 1. IDENTIFICATION

**Product identifier**

**Product Name**
EDTA Tetrasodium Salt 0.800 ± 0.004 M

**Other means of identification**

**Product Code(s)**
1439901

**Safety data sheet number**
M00449

**Component of Kits or Sets**
001-H00522.88; 2063600; 2063600RGT; 2063900; 2063900RGT; 2272000; 2272100; 2350600; 2350600RGT; 2350700; 2350700RGT; 243001; 243001RGT; 243003; 243003RGT; 2447500; 2448100; 2448700; 251232; 251232K; 251233; 251233K; 251235; 251235K; 251238; 251238K; 251239; 251239K; 251239; 251239K; 2687900K; 2690200; 2690600; 2690800; 2690900; 2691700; 2922400; 2922400K; 2922401; 2922401K; 2922500; 2922500K; 2922501; 2922501K; 2922600; 2922600K; 2922601; 2922601K; 2923200; 2923300; 2953100; 2991100; 2991200; 2994000; 2994000K; 2994010; 2997100; 6024656; L7420; L7420K

**Recommended use of the chemical and restrictions on use**

**Recommended Use**

**Uses advised against**
None.

**Restrictions on use**
None.

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

**Manufacturer Address**
Hach Company
P.O.Box 389 Loveland, CO 80539 USA
(970) 669-3050

**Emergency telephone number**
(303) 623-5716 - 24 Hour Service (515)232-2533 - 8am - 4pm CST

**Product Information**

**Chemical Name**
Not applicable

**Formula**
Not applicable

**CAS No**
Not applicable

**Alternate CAS Number**
Not applicable

**NIOSH (RTECS) Number**
None reported

## 2. HAZARDS IDENTIFICATION

**Classification**

**Regulatory Status**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

**Serious eye damage/eye irritation**
Category 1
Product Code(s) 1439901
Issue Date 21-Jul-2016
Version 2

Product Name EDTA Tetrasodium Salt 0.800 ± 0.004 M
Revision Date 23-Aug-2016
Page 2 / 20

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word - Danger

Hazard statements
H318 - Causes serious eye damage
EUH208 - May produce an allergic reaction

Precautionary statements
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
P310 - Immediately call a POISON CENTER or doctor/physician

Other Information
Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

Chemical Family Mixture.

Percent ranges are used where confidential product information is applicable.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>Percent Range</th>
<th>HMRIC #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrasodium EDTA</td>
<td>64-02-8</td>
<td>10 - 30</td>
<td>-</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>&lt;0.1</td>
<td>-</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>67-56-1</td>
<td>&lt;0.1</td>
<td>-</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

**Description of first aid measures**

**General advice**
In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

**Eye contact**
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.

**Skin contact**
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If symptoms persist, call a physician.

**Inhalation**
IF INHALED: Remove person to fresh air and keep comfortable for breathing. If symptoms persist, call a physician.

**Ingestion**
IF SWALLOWED: Rinse Mouth. If symptoms persist, call a physician.

**Self-protection of the first aider**
Use personal protective equipment as required. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

**Most important symptoms and effects, both acute and delayed**

**Symptoms**
See Section 11: TOXICOLOGICAL INFORMATION.

**Indication of any immediate medical attention and special treatment needed**

**Note to physicians**
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Unsuitable extinguishing media**
Caution: Use of water spray when fighting fire may be inefficient.

**Flammable properties**
Material is not classified as flammable according to GHS criteria. Substance does not burn.

**Specific hazards arising from the chemical**
None reported.

**Hazardous combustion products**
This material will not burn.

**Protective equipment and precautions for firefighters**
Wear self contained breathing apparatus for fire fighting if necessary.

**Special protective equipment for fire-fighters**
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

**U.S. Notice**
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company’s emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

**EC Notice**
Only persons properly qualified to respond to an emergency involving hazardous
substances should respond to a spill involving chemicals. See Section 13, Special Instructions for disposal assistance.

WHMIS Notice

Only persons properly qualified to respond to an emergency involving hazardous substances should respond to a spill involving chemicals. See Section 13, Special Instructions for disposal assistance.

Personal precautions, protective equipment and emergency procedures

Personal precautions
Evacuate personnel to safe areas. Do not touch or walk through spilled material. Ventilate affected area. Use personal protective equipment as required.

For emergency responders
Use personal protection recommended in Section 8.

Environmental precautions
Avoid release to the environment. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up
Neutralize spill if necessary. Soak up with inert absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Dispose of in accordance with local, state and federal regulations or laws.

Emergency Response Guide Number
Not applicable

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Do not breathe dust/fume/gas/mist/vapors/spray.

Conditions for safe storage, including any incompatibilities

Storage Conditions
Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a cool, well-ventilated place. Keep in properly labeled containers.

Flammability class
Not applicable

Incompatible materials

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
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</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Ceiling: 0.3 ppm</td>
<td>TWA: 0.75 ppm</td>
<td>IDLH: 20 ppm</td>
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<tr>
<td></td>
<td></td>
<td>(vacated) TWA: 3 ppm</td>
<td>Ceiling: 0.1 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) STEL: 10 ppm</td>
<td>TWA: 0.016 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) Ceiling: 5 ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL: 2 ppm</td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>STEL: 250 ppm</td>
<td>TWA: 200 ppm</td>
<td>IDLH: 6000 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 200 ppm</td>
<td>TWA: 260 mg/m³</td>
<td>TWA: 200 ppm</td>
</tr>
<tr>
<td></td>
<td>S*</td>
<td>(vacated) TWA: 200 ppm</td>
<td>TWA: 260 mg/m³</td>
</tr>
</tbody>
</table>
**Product Code(s)** 1439901  
**Issue Date** 21-Jul-2016  
**Revision Date** 23-Aug-2016  
**Page** 5 / 20

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Alberta OEL</th>
<th>British Columbia OEL</th>
<th>Manitoba OEL</th>
<th>New Brunswick OEL</th>
<th>New Foundland &amp; Labrador OEL</th>
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</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Ceiling: 1 ppm</td>
<td>TWA: 0.3 ppm</td>
<td>Ceiling: 0.3 ppm</td>
<td>TWA: 0.5 ppm</td>
<td>RSP+ Ceiling: 0.3 ppm</td>
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<tr>
<td></td>
<td>Ceiling: 1.3 mg/m³</td>
<td>GVF: 0.9 mg/m³</td>
<td></td>
<td>STEL: 1.5 ppm</td>
<td>SNK+</td>
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<td>Methyl alcohol</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
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<tr>
<td></td>
<td>SKN*</td>
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</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Northwest Territories OEL</th>
<th>Nova Scotia OEL</th>
<th>Nunavut OEL</th>
<th>Ontario TWA</th>
<th>Prince Edward Island OEL</th>
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<td>RSP+ Ceiling: 0.3 ppm</td>
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<td>STEL: 1 ppm</td>
<td>Ceiling: 0.3 ppm</td>
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<tr>
<td></td>
<td>SKN+</td>
<td>SKN+</td>
<td></td>
<td>Ceiling: 1.5 ppm</td>
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</tr>
<tr>
<td>Methyl alcohol</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
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<td>SKN*</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Quebec OEL</th>
<th>Saskatchewan OEL</th>
<th>Yukon OEL</th>
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<tbody>
<tr>
<td>Formaldehyde</td>
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<td>Ceiling: 0.3 ppm</td>
<td>Ceiling: 2 ppm</td>
</tr>
<tr>
<td></td>
<td>Ceiling: 3 mg/m³</td>
<td>Ceiling: 3 mg/m³</td>
<td>Ceiling: 3 mg/m³</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 262 mg/m³</td>
<td>TWA: 262 mg/m³</td>
<td>TWA: 262 mg/m³</td>
</tr>
<tr>
<td></td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
<td>STEL: 250 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 328 mg/m³</td>
<td>STEL: 328 mg/m³</td>
<td>STEL: 328 mg/m³</td>
</tr>
<tr>
<td></td>
<td>SKN*</td>
<td>SKN*</td>
<td>SKN*</td>
</tr>
</tbody>
</table>

**Other Information**  
Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

**Legend**  
See section 16 for terms and abbreviations

**Appropriate engineering controls**  
Showers  
Eyewash stations  
Ventilation systems

**Individual protection measures, such as personal protective equipment**  
**Eye/face protection**  
Wear tight sealing safety goggles and/or face protection shield.

**Skin and body protection**  
Wear protective gloves and protective clothing.

**Respiratory protection**  
In case of insufficient ventilation, wear suitable respiratory equipment.

**General Hygiene Considerations**  
Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Take off all contaminated clothing and wash it before reuse. Wash hands thoroughly after handling. Regular cleaning of equipment, work area and clothing is recommended.

**Environmental exposure controls**  
Do not allow into any sewer, on the ground or into any body of water.
9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state
- Liquid

Gas Under Pressure
- Not classified according to GHS criteria

Appearance
- aqueous solution

Color
- colorless

Odor
- Odorless

Odor threshold
- No data available

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks / Method</th>
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<tbody>
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</tr>
<tr>
<td>pH</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-14 °C / 7 °F</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>104 °C / 219 °F</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>0.98 (water = 1)</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>23.027 mm Hg / 3.07 kPa at 25 °C / 77 °F</td>
<td></td>
</tr>
<tr>
<td>Vapor density (air = 1)</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Specific gravity (water = 1 / air = 1)</td>
<td>1.160</td>
<td></td>
</tr>
<tr>
<td>Partition Coefficient (n-octanol/water)</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Soil Organic Carbon-Water Partition Coefficient</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>~ 1 cP (mPa s) at 20 °C / 68 °F</td>
<td></td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>~ 0.862 cSt (mm²/s) at 20 °C / 68 °F</td>
<td></td>
</tr>
</tbody>
</table>

Solubility(ies)

Water solubility

<table>
<thead>
<tr>
<th>Water solubility classification</th>
<th>Water solubility</th>
<th>Water Solubility Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soluble</td>
<td>&gt; 1000 mg/L</td>
<td>25 °C / 77 °F</td>
</tr>
</tbody>
</table>

Solubility in other solvents

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Solubility classification</th>
<th>Solubility</th>
<th>Solubility Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>None reported</td>
<td>No information available</td>
<td>No data available</td>
<td>No information available</td>
</tr>
</tbody>
</table>

Other Information

Metal Corrosivity
- Not classified as corrosive to metal according to GHS criteria
10. STABILITY AND REACTIVITY

Reactivity properties
Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.

Chemical stability
Stable under recommended storage conditions.

Special dangers of the product
None reported

Possibility of Hazardous Reactions
None under normal processing.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Extreme temperatures. Evaporation.

Incompatible materials
Hazardous Decomposition Products

Explosive properties
Not classified according to GHS criteria.

Upper explosion limit No data available
Lower explosion limit No data available

Autoignition temperature
No data available

Sensitivity to Static Discharge
None reported

Sensitivity to Mechanical Impact
None reported

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

<table>
<thead>
<tr>
<th>Product Information</th>
<th>Corrosive to eyes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>No known effect based on information supplied.</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Corrosive to the eyes and may cause severe damage including blindness.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>No known effect based on information supplied.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>No known effect based on information supplied.</td>
</tr>
<tr>
<td>Aggravated Medical Conditions</td>
<td>Eye disorders.</td>
</tr>
<tr>
<td>Toxicologically synergistic products</td>
<td>None known.</td>
</tr>
</tbody>
</table>

Toxicokinetics, metabolism and distribution
See ingredients information below.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicokinetics, metabolism and distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1)</td>
<td>Readily Absorbed via the respiratory and gastrointestinal routes. Absorbed formaldehyde can be oxidized to formate and carbon dioxide. Half-life of formaldehyde is 1 min in rat plasma.</td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1)</td>
<td>Metabolism of methanol appears to be similar regardless of administrative route. Methanol is converted to formaldehyde, which is converted to formate which is oxidized to carbon dioxide in primates.</td>
</tr>
</tbody>
</table>

Product Acute Toxicity Data

<table>
<thead>
<tr>
<th>Oral Exposure Route</th>
<th>No data available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal Exposure Route</td>
<td>No data available</td>
</tr>
<tr>
<td>Inhalation (Dust/Mist) Exposure Route</td>
<td>No data available</td>
</tr>
<tr>
<td>Inhalation (Vapor) Exposure Route</td>
<td>No data available</td>
</tr>
<tr>
<td>Inhalation (Gas) Exposure Route</td>
<td>No data available</td>
</tr>
</tbody>
</table>

The following values are calculated based on chapter 3.1 of the GHS document

| ATEmix (oral) | 5.775.00 mg/kg |

Ingredient Acute Toxicity Data
### Oral Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrasodium EDTA (10 - 30) CAS#: 64-02-8</td>
<td>Rat LD₅₀</td>
<td>1658 mg/kg</td>
<td>None reported</td>
<td>None reported</td>
<td>ERMA (New Zealand’s Environmental Risk Management Authority)</td>
</tr>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Rat LD₅₀</td>
<td>100 mg/kg</td>
<td>None reported</td>
<td>None reported</td>
<td>No information available</td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>Human LD₅₀</td>
<td>300 mg/kg</td>
<td>None reported</td>
<td>None reported</td>
<td>IUCLID (The International Uniform Chemical Information Database)</td>
</tr>
</tbody>
</table>

### Dermal Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Human TD₅₀</td>
<td>643 mg/kg</td>
<td>None reported</td>
<td>Lungs, Thorax, or Respiration Respiratory obstruction</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>Man LD₅₀</td>
<td>3.571 mg/kg</td>
<td>None reported</td>
<td>Lungs, Thorax, or Respiration Dyspnea</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Inhalation (Dust/Mist) Exposure Route

No data available

### Inhalation (Vapor) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Rat LC₅₀</td>
<td>250 mg/L</td>
<td>4 hours</td>
<td>None reported</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1)</td>
<td>Human LC₅₀</td>
<td>10 mg/L</td>
<td>4 hours</td>
<td>None reported</td>
<td>IUCLID (The International Uniform Chemical Information Database)</td>
</tr>
</tbody>
</table>
### Chemical Name: Methyl alcohol (≤0.1) CAS#: 67-56-1

<table>
<thead>
<tr>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC₅₀</td>
<td>64000 mg/L</td>
<td>6 hours</td>
<td>None reported</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Chemical Name: Methyl alcohol (≤0.1) CAS#: 67-56-1

<table>
<thead>
<tr>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC₃₀</td>
<td>300 mg/L</td>
<td>None reported</td>
<td>Lungs, Thorax, or Respiration, Other changes</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Inhalation (Gas) Exposure Route

No data available

### Product Skin Corrosion/Irritation Data

No data available.

### Ingredient Skin Corrosion/Irritation Data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test method</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Standard Draize Test</td>
<td>Human</td>
<td>0.150 mg</td>
<td>72 hours</td>
<td>Corrosive to skin</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>Standard Draize Test</td>
<td>Rabbit</td>
<td>20 mg</td>
<td>24 hours</td>
<td>Skin irritant</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Chemical Name: Formaldehyde CAS#: 50-00-0

<table>
<thead>
<tr>
<th>Test method</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Draize Test</td>
<td>Rabbit</td>
<td>2 mg</td>
<td>24 hours</td>
<td>Corrosive to skin</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Product Serious Eye Damage/Eye Irritation Data

No data available.

### Ingredient Eye Damage/Eye Irritation Data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test method</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Rinse Test</td>
<td>Human</td>
<td>1 ppm</td>
<td>6 minutes</td>
<td>Corrosive to eyes</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>Standard Draize Test</td>
<td>Rabbit</td>
<td>40 mg</td>
<td>None reported</td>
<td>Eye irritant</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Sensitization Information
Product Sensitization Data

Skin Sensitization Exposure Route
No data available.

Respiratory Sensitization Exposure Route
No data available.

Ingredient Sensitization Data

Skin Sensitization Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test method</th>
<th>Species</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Patch test</td>
<td>Human</td>
<td>Confirmed to be a skin sensitizer</td>
<td>ERMA (New Zealand's Environmental Risk Management Authority)</td>
</tr>
<tr>
<td>(&lt;0.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respiratory Sensitization Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test method</th>
<th>Species</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>IgE Specific</td>
<td>Guinea pig</td>
<td>Confirmed to be a respiratory sensitizer</td>
<td>CICAD (Concise International Chemical Assessment Documents)</td>
</tr>
<tr>
<td>(&lt;0.1)</td>
<td>Immune Response</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td>Test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chronic Toxicity Information

Product Repeat Dose Toxicity Data

Oral Exposure Route
No data available.

Dermal Exposure Route
No data available.

Inhalation (Dust/Mist) Exposure Route
No data available.

Inhalation (Vapor) Exposure Route
No data available.

Inhalation (Gas) Exposure Route
No data available.

Ingredient Repeat Dose Toxicity Data

Oral Exposure Route
No data available

Dermal Exposure Route
No data available

Inhalation (Dust/Mist) Exposure Route
No data available

Inhalation (Vapor) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>TC\textsubscript{Lo}</td>
<td>0.017 mg/L</td>
<td>0.5 days</td>
<td>Eye Lmpiration Lungs, Thorax, or Respiration Other changes</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>(&lt;0.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inhalation (Gas) Exposure Route
No data available.
Product Code(s)  1439901
Issue Date  21-Jul-2016
Version 2

Product Name  EDTA Tetrasodium Salt 0.800 ± 0.004 M
Revision Date  23-Aug-2016
Page  12 / 20

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrasodium EDTA</td>
<td>64-02-8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>A2</td>
<td>Group 1</td>
<td>Known</td>
<td>X</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>67-56-1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)  Does not apply
IARC (International Agency for Research on Cancer)  Does not apply
NTP (National Toxicology Program)  Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)  X - Present

Product Carcinogenicity Data  No data available
Oral Exposure Route  No data available
Dermal Exposure Route  No data available
Inhalation (Dust/Mist) Exposure Route  No data available
Inhalation (Vapor) Exposure Route  No data available
Inhalation (Gas) Exposure Route  No data available

Ingredient Carcinogenicity Data
Oral Exposure Route  No data available
Dermal Exposure Route  No data available
Inhalation (Dust/Mist) Exposure Route  No data available

Inhalation (Vapor) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Rat</td>
<td>15 mg/L</td>
<td>78 weeks</td>
<td>Olfaction Tumors</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

Inhalation (Gas) Exposure Route  No data available

Product Germ Cell Mutagenicity invitro Data
No data available.

Ingredient Germ Cell Mutagenicity invitro Data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test</th>
<th>Cell Strain</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>DNA inhibition</td>
<td>Human lymphocyte</td>
<td>300 mmol/L</td>
<td>None reported</td>
<td>Positive test result for mutagenicity</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

Oral Exposure Route  No data available
Dermal Exposure Route  No data available
Inhalation (Dust/Mist) Exposure Route  No data available
**Product Code(s)** 1439901  
**Product Name** EDTA Tetrasodium Salt 0.800 ± 0.004 M  
**Issue Date** 21-Jul-2016  
**Revision Date** 23-Aug-2016  
**Version** 2  
**Page** 13 / 20

### Inhalation (Vapor) Exposure Route
No data available

### Inhalation (Gas) Exposure Route
No data available

### Ingredient Germ Cell Mutagenicity *invivo* Data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl alcohol (≤0.1) CAS#: 67-56-1</td>
<td>DNA damage</td>
<td>Rat</td>
<td>0.405 mg/kg</td>
<td>None reported</td>
<td>Positive test result for mutagenicity</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol (≤0.1) CAS#: 67-56-1</td>
<td>Cytogenetic analysis</td>
<td>Mouse</td>
<td>1000 mg/kg</td>
<td>None reported</td>
<td>Positive test result for mutagenicity</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Dermal Exposure Route
No data available

### Inhalation (Dust/Mist) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (≤0.1) CAS#: 50-00-0</td>
<td>DNA damage</td>
<td>Rat</td>
<td>0.000035 mg/L</td>
<td>8 weeks</td>
<td>Positive test result for mutagenicity</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Inhalation (Vapor) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test</th>
<th>Species</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Results</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (≤0.1) CAS#: 50-00-0</td>
<td>Micronucleus test</td>
<td>Human</td>
<td>.000985 mg/L</td>
<td>8.5 years</td>
<td>Positive test result for mutagenicity</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

### Oral Exposure Route
No data available

### Dermal Exposure Route
No data available

### Inhalation (Dust/Mist) Exposure Route
No data available

### Inhalation (Vapor) Exposure Route
No data available

### Inhalation (Gas) Exposure Route
No data available
### Ingredient Reproductive Toxicity Data

#### Oral Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>Rat TD&lt;sub&gt;Lo&lt;/sub&gt;</td>
<td>4118 mg/kg</td>
<td>10 days</td>
<td>Effects on Embryo or Fetus Fetotoxicity (except death e.g. stunted fetus) Specific Developmental Abnormalities Ear Eye Urogenital System</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

#### Dermal Exposure Route

No data available

#### Inhalation (Dust/Mist) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>Rat TC&lt;sub&gt;Lo&lt;/sub&gt;</td>
<td>0.0026 mg/L</td>
<td>22 days</td>
<td>Effects on Embryo or Fetus Fetotoxicity (except death e.g. stunted fetus)</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

#### Inhalation (Vapor) Exposure Route

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Exposure time</th>
<th>Toxicological effects</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Rat TC&lt;sub&gt;Lo&lt;/sub&gt;</td>
<td>.001 mg/L</td>
<td>24 weeks</td>
<td>Effects on Embryo or Fetus Cytological changes (including somatic cell genetic material)</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1) CAS#: 67-56-1</td>
<td>Mouse TC&lt;sub&gt;Lo&lt;/sub&gt;</td>
<td>1500 mg/L</td>
<td>7-9 days</td>
<td>Specific Developmental Abnormalities Central Nervous System</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Rat TC&lt;sub&gt;Lo&lt;/sub&gt;</td>
<td>.0005 mg/L</td>
<td>19 days</td>
<td>Specific Developmental Abnormalities Musculoskeletal system</td>
<td>RTECS (Registry of Toxic Effects of Chemical Substances)</td>
</tr>
</tbody>
</table>

#### Inhalation (Gas) Exposure Route

No data available

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Based on the classification principles, not classified as hazardous to the environment.

#### Product Ecological Data

**Aquatic toxicity**

- **Fish**: No data available
- **Crustacea**: No data available
- **Algae**: No data available
**Product Code(s)** 1439901  
**Product Name** EDTA Tetrasodium Salt 0.800 ± 0.004 M  
**Issue Date** 21-Jul-2016  
**Revision Date** 23-Aug-2016  
**Version** 2  
**Page** 15 / 20

### Terrestrial toxicity

<table>
<thead>
<tr>
<th>Environment</th>
<th>Toxicity</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Vertebrates</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Invertebrates</td>
<td>No data available</td>
<td></td>
</tr>
</tbody>
</table>

### Ingredient Ecological Data

#### Aquatic toxicity

**Fish**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure time</th>
<th>Species</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>96 hours</td>
<td><em>Morone saxatilis</em></td>
<td>LC50</td>
<td>6.7 mg/L</td>
<td>PEEN (Pan European Ecological Network)</td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>96 hours</td>
<td><em>Pimephales promelas</em></td>
<td>LC50</td>
<td>15000 mg/L</td>
<td>IUCLID (The International Uniform Chemical Information Database)</td>
</tr>
<tr>
<td>(&lt;0.1) CAS#: 67-56-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Chemical Name**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure time</th>
<th>Species</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>96 hours</td>
<td>None reported</td>
<td>LC50</td>
<td>52.5 mg/L</td>
<td>PEEN (Pan European Ecological Network)</td>
</tr>
<tr>
<td>(&lt;0.1) CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crustacea**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure time</th>
<th>Species</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>48 hours</td>
<td><em>Daphnia pulex</em></td>
<td>EC50</td>
<td>5.8 mg/L</td>
<td>PEEN (Pan European Ecological Network)</td>
</tr>
<tr>
<td>(&lt;0.1) CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure time</th>
<th>Species</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl alcohol</td>
<td>48 hours</td>
<td><em>Daphnia magna</em></td>
<td>EC50 LC50</td>
<td>2500 mg/L</td>
<td>IUCLID (The International Uniform Chemical Information Database)</td>
</tr>
<tr>
<td>(&lt;0.1) CAS#: 67-56-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure time</th>
<th>Species</th>
<th>Endpoint type</th>
<th>Reported dose</th>
<th>Key literature references and sources for data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>48 hours</td>
<td><em>Daphnia magna</em></td>
<td>EC50</td>
<td>29 mg/L</td>
<td>PEEN (Pan European Ecological Network)</td>
</tr>
<tr>
<td>(&lt;0.1) CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Algae**

No data available

### Terrestrial toxicity

<table>
<thead>
<tr>
<th>Environment</th>
<th>Toxicity</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Vertebrates</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Invertebrates</td>
<td>No data available</td>
<td></td>
</tr>
</tbody>
</table>

### Other Information

#### Persistence and degradability

None known.

#### Product Biodegradability Data

If available, see ingredient data below.
Ingredient Biodegradability Data
Test data reported below

Bioaccumulation
If available, see ingredient data below.

Product Bioaccumulation Data
If available, see ingredient data below.

Ingredient Bioaccumulation Data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Test method</th>
<th>Exposure time</th>
<th>Species</th>
<th>Bioconcentration factor (BCF)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>None reported</td>
<td>None reported</td>
<td>None reported</td>
<td>None reported</td>
<td>Does not have the potential to bioaccumulate</td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional information

Product Information

Partition Coefficient (n-octanol/water)
Not applicable

Ingredient Information

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Partition Coefficient (n-octanol/water)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1)</td>
<td>log $K_{ow} = 0.35$</td>
<td>No information available</td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1)</td>
<td>log $K_{ow} = -0.7$</td>
<td>No information available</td>
</tr>
<tr>
<td>CAS#: 67-56-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mobility
Mobility in soil: High mobility. If available, see ingredient data below.

Product Information

Soil Organic Carbon-Water Partition Coefficient
Not applicable

Ingredient Information

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Soil Organic Carbon-Water Partition Coefficient</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1)</td>
<td>log $K_{oc} = 0.89$</td>
<td>No information available</td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol (&lt;0.1)</td>
<td>log $K_{oc} = 0.44$</td>
<td>No information available</td>
</tr>
<tr>
<td>CAS#: 67-56-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional information

Water solubility

Product Information
### Ingredient Information

**Chemical Name**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Water solubility classification</th>
<th>Water solubility</th>
<th>Water solubility temperature °C</th>
<th>Water solubility temperature °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Completely soluble</td>
<td>&gt; 40000 mg/L</td>
<td>20 °C</td>
<td>68 °F</td>
</tr>
<tr>
<td>CAS#: 50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>Soluble</td>
<td>&gt; 1000 mg/L</td>
<td>25 °C</td>
<td>77 °F</td>
</tr>
<tr>
<td>CAS#: 67-56-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Other adverse effects
Contains a substance with an endocrine-disrupting potential.

---

### 13. DISPOSAL CONSIDERATIONS

#### Waste treatment methods

**Disposal of wastes**

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

**Contaminated packaging**

Working in a well-ventilated area. Rinse three times with an appropriate solvent. Collect rinsate and dispose of according to local, state, or federal regulations. Dispose of empty container as normal trash. In the US, rinsate from empty containers is classified as hazardous waste and should be disposed of at an E.P.A. approved facility. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste in countries other than the US. Improper disposal or reuse of this container may be dangerous and illegal. Disposal should be in accordance with applicable regional, national, and local laws and regulations.

**US EPA Waste Number**

U122 U154

---

### Special instructions for disposal

Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. If permitted by regulation. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system. Check with national, local municipal and state authorities and waste contractors for pertinent local information on the disposal of this article.

---

### 14. TRANSPORT INFORMATION

**DOT**

Not regulated

**TDG**

Not regulated
IATA: Not regulated
IMDG: Not regulated

Note: No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies. If the item is part of a reagent set or kit the classification would change to the following: UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories
TSCA: Complies
DSL/NDSL: Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories
EINECS/ELINCS: Complies
ENCS: Complies
IECSC: Complies
KECL: Complies
PICCS: Complies
TCI: Complies
AICS: Complies
NZIoC: Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (CAS #: 50-00-0)</td>
<td>0.1</td>
</tr>
<tr>
<td>Methyl alcohol (CAS #: 67-56-1)</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories

- Acute health hazard: Yes
- Chronic Health Hazard: No
- Fire hazard: No
- Sudden release of pressure hazard: No
- Reactive Hazard: No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)
CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA/SARA RQ</th>
<th>Reportable Quantity (RQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde 50-00-0</td>
<td>100 lb</td>
<td>100 lb</td>
<td>RQ 100 lb final RQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RQ 45.4 kg final RQ</td>
</tr>
<tr>
<td>Methyl alcohol 67-56-1</td>
<td>5000 lb</td>
<td>-</td>
<td>RQ 5000 lb final RQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RQ 2270 kg final RQ</td>
</tr>
</tbody>
</table>

U.S. - Department of Homeland Security - Chemical Facility Anti-Terrorism Standards (CFATS) - Security Issues

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>U.S. - Department of Homeland Security - Chemical Facility Anti-Terrorism Standards (CFATS) - Security Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde (&lt;0.1) CAS#: 50-00-0</td>
<td>Release - Toxic (solution)</td>
</tr>
</tbody>
</table>

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde 50-00-0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Methyl alcohol 67-56-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA and HMIS Classifications

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazards - 3</th>
<th>Flammability - 0</th>
<th>Instability - 0</th>
<th>Physical and Chemical Properties -</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS</td>
<td>Health hazards - 3</td>
<td>Flammability - 0</td>
<td>Physical hazards - 0</td>
<td>Personal protection - X</td>
</tr>
</tbody>
</table>

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH Immediately Dangerous to Life or Health
### Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>TWA (time-weighted average)</td>
<td>STEL</td>
<td>STEL (Short Term Exposure Limit)</td>
</tr>
<tr>
<td>MAC</td>
<td>Maximum Allowable Concentration</td>
<td>Ceiling</td>
<td>Ceiling Limit Value</td>
</tr>
<tr>
<td>X</td>
<td>Listed</td>
<td>Vacated</td>
<td>These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these “liberated” exposure limits in their state regulations.</td>
</tr>
<tr>
<td>SKN*</td>
<td>Skin designation</td>
<td>SKN+</td>
<td>Skin sensitization</td>
</tr>
<tr>
<td>RSP+</td>
<td>Respiratory sensitization</td>
<td>**</td>
<td>Hazard Designation</td>
</tr>
<tr>
<td>C</td>
<td>Carcinogen</td>
<td>R</td>
<td>Reproductive toxicant</td>
</tr>
<tr>
<td>M</td>
<td>mutagen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Prepared By

Hach Product Compliance Department

### Issue Date

21-Jul-2016

### Revision Date

23-Aug-2016

### Revision Note

None

### Disclaimer

**USER RESPONSIBILITY:** Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

HACH COMPANY ©2015

---

End of Safety Data Sheet
Material Safety Data Sheet
Ferric chloride MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ferric chloride
Catalog Codes: SLF1675, SLF2188
CAS#: 7705-08-0
RTECS: LJ9100000
TSCA: TSCA 8(b) inventory: Ferric chloride
CI#: Not available.
Synonym: 
Chemical Formula: FeCl3

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: 1-800-901-7247
International Sales: 1-281-441-4400
Order Online: ScienceLab.com
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferric chloride</td>
<td>7705-08-0</td>
<td>100</td>
</tr>
</tbody>
</table>

Toxicological Data on Ingredients: Ferric chloride: ORAL (LD50): Acute: 900 mg/kg [Rat]. 1278 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures
Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

---

Section 5: Fire and Explosion Data

| Flammability of the Product: | Non-flammable. |
| Auto-Ignition Temperature: | Not applicable. |
| Flash Points: | Not applicable. |
| Flammable Limits: | Not applicable. |
| Products of Combustion: | Not available. |
| Fire Hazards in Presence of Various Substances: | Not applicable. |
| Fire Fighting Media and Instructions: | Not applicable. |
| Special Remarks on Fire Hazards: | Not available. |
| Special Remarks on Explosion Hazards: | Not available. |

---

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.
Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

**Section 7: Handling and Storage**

**Precautions:**
Keep locked up. Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from direct sunlight or strong incandescent light. Do not ingest. Do not breathe dust. Never add water to this product. Avoid shock and friction. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

**Storage:** Corrosive materials should be stored in a separate safety storage cabinet or room.

**Section 8: Exposure Controls/Personal Protection**

**Engineering Controls:**
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 1 CEIL: 2 (mg/m3) Consult local authorities for acceptable exposure limits.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 162.21 g/mole

**Color:** Not available.

**pH (1% soln/water):** 2 [Acidic.]

**Boiling Point:** 316°C (600.8°F)

**Melting Point:** 306°C (582.8°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 2.9 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** 5.61 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water.
Solubility: Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Not available.
Incompatibility with various substances:
The product may undergo hazardous decomposition, condensation or polymerization, it may react violently with water to emit toxic gases or it may become self-reactive under conditions of shock or increase in temperature or pressure.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.
Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.
Toxicity to Animals: Acute oral toxicity (LD50): 900 mg/kg [Rat].
Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.
Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Not available.
Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation: The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive solid.
Identification: Ferric chloride, anhydrous: UN1773 PG: III
Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Ferric chloride
Massachusetts RTK: Ferric chloride
TSCA 8(b) inventory: Ferric chloride
CERCLA: Hazardous substances.


Other Classifications:
WHMIS (Canada):
CLASS E: Corrosive solid. CLASS F: Dangerously reactive material.

DSCL (EEC):
R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):
  Health Hazard: 3
  Fire Hazard: 0
  Reactivity: 2
  Personal Protection: j

National Fire Protection Association (U.S.A.):
  Health: 3
  Flammability: 0
  Reactivity: 2
  Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:32 PM
Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.
1 Identification

Identification of substance or preparation
FLOGARD MS6209

Product Application Area
Water-based corrosion inhibitor.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940


2 Hazard(s) identification

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel
Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media:
dry chemical/CO2/foam or water--slippery condition; use sand/grit.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS: Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED: Not known.

SYMPTOMS OF EXPOSURE: Causes severe irritation, burns or tissue ulceration with subsequent scarring.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

HAZARDOUS INGREDIENTS:

<table>
<thead>
<tr>
<th>Cas#</th>
<th>Chemical Name</th>
<th>Range (w/w%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13598-37-3</td>
<td>PHOSPHORIC ACID, ZINC SALT (2:1)</td>
<td>40-70</td>
</tr>
<tr>
<td></td>
<td>Irritant</td>
<td></td>
</tr>
<tr>
<td>7664-38-2</td>
<td>PHOSPHORIC ACID</td>
<td>15-40</td>
</tr>
<tr>
<td></td>
<td>Corrosive</td>
<td></td>
</tr>
</tbody>
</table>

NON-HAZARDOUS INGREDIENTS:

<table>
<thead>
<tr>
<th>CAS#</th>
<th>CHEMICAL NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>7732-18-5</td>
<td>WATER</td>
</tr>
</tbody>
</table>

4 First-aid measures

SKIN CONTACT: URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT: URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION: Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION: Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.
NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical/CO2/foam or water--slippery condition; use sand/grit.

HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of phosphorus

FLASH POINT:
> 200F > 93C P-M(CC)

MISCELLANEOUS:
Corrosive to skin/steel
UN 1805; Emergency Response Guide #154

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:
Acidic. Corrosive (Skin/eyes). Do not mix with alkaline material.

STORAGE:
Keep containers closed when not in use. Preferably stored between 40-100F (5-38C).

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

PHOSPHORIC ACID, ZINC SALT (2:1)
PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.
TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

PHOSPHORIC ACID
PEL (OSHA): 1 MG/M3
TLV (ACGIH): TWA = 1 MG/M3; STEL = 3 MG/M3
MISC: NIOSH REL = 1 MG/M3; NIOSH STEL = 3 MG/M3; NIOSH IDLH = 1000 MG/M3
ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29 CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA’S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR’S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:
Gauntlet-type rubber, butyl or neoprene gloves, chemical resistant apron -- Wash off after each use. Replace as necessary.

EYE PROTECTION:
Splash proof chemical goggles, face shield

9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec. Grav. (70F,21C)</td>
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<tr>
<td>Vapor Pressure (mmHg)</td>
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<tr>
<td>Freeze Point (F)</td>
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</tr>
<tr>
<td>Freeze Point (C)</td>
<td>&lt; -34</td>
</tr>
<tr>
<td>Viscosity (cps 70F,21C)</td>
<td>70</td>
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<tr>
<td>% Solubility (water)</td>
<td>100.0</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless To Yellow</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Flash Point P-M(CC)</td>
<td>&gt; 200°F &gt; 93°C</td>
</tr>
<tr>
<td>pH As Is (approx.)</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Evaporation Rate (Ether=1)</td>
<td>&lt; 1.00</td>
</tr>
<tr>
<td>Percent VOC:</td>
<td>0.0</td>
</tr>
</tbody>
</table>

NA = not applicable    ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:
Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:
May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:
oxides of phosphorus

11 Toxicological information
Oral LD50 RAT: 2830 mg/kg
NOTE - Calculated value according to GHS additivity formula
Dermal LD50 RABBIT: 3890 mg/kg
NOTE - Calculated value according to GHS additivity formula
Skin Irritation Score RABBIT: CORROSIVE
NOTE - EPA Category I
Eye Irritation Score RABBIT: CORROSIVE
NOTE - Estimated value

12 Ecological information

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= 1.5; No Effect Level= .63 mg/L
Ceriodaphnia 7 Day Static Renewal Bioassay
IC25 = 1.9 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 12; No Effect Level= 1.5 mg/L
Fathead Minnow 7 Day Static Renewal Bioassay
IC25 = 5 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 14; No Effect Level= 2.5 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 4.9; No Effect Level= 1.6 mg/L

BIODEGRADATION
Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive (pH, steel); D006=Cadmium; D008=Lead.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation Hazard: Corrosive to skin/steel
DOT: PHOSPHORIC ACID SOLUTION
8, UN1805, PG III, RQ
DOT EMERGENCY RESPONSE GUIDE #: 154
Note: Some containers may be DOT exempt, please check BOL for exact container classification
IATA: PHOSPHORIC ACID SOLUTION
8, UN1805, PG III
IMDG: PHOSPHORIC ACID SOLUTION
8, UN1805, PG III
15 Regulatory information

TSCA:
All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
1,962 gallons due to PHOSPHORIC ACID;

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: 140901
Category Code(s):
G5 Cooling and retort water treatment products - all food processing areas
G7 Boiler treatment products - all food processing areas/nonfood contact

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

<table>
<thead>
<tr>
<th>CAS#</th>
<th>CHEMICAL NAME</th>
<th>RANGE</th>
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</thead>
<tbody>
<tr>
<td>13598-37-3</td>
<td>PHOSPHORIC ACID, ZINC SALT (2:1)</td>
<td>41.0-50.0%</td>
</tr>
</tbody>
</table>

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII

<table>
<thead>
<tr>
<th>CODE TRANSLATION</th>
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</thead>
<tbody>
<tr>
<td>Health 3</td>
</tr>
<tr>
<td>Fire 0</td>
</tr>
<tr>
<td>Reactivity 0</td>
</tr>
<tr>
<td>Special CORR</td>
</tr>
<tr>
<td>(1) Protective Equipment D</td>
</tr>
</tbody>
</table>

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

<table>
<thead>
<tr>
<th>EFFECTIVE DATE</th>
<th>REVISIONS TO SECTION</th>
<th>SUPERCEDES</th>
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<tbody>
<tr>
<td>11-NOV-1997</td>
<td>** NEW **</td>
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<tr>
<td>05-JAN-1999</td>
<td>10</td>
<td>11-NOV-1997</td>
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<td>25-JUN-1999</td>
<td>11</td>
<td>05-JAN-1999</td>
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<td>03-JAN-2001</td>
<td>15</td>
<td>13-JUL-2000</td>
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<td>Date</td>
<td>Numbers</td>
<td>Date</td>
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<td>12</td>
<td>03-JAN-2001</td>
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<td>01-MAY-2007</td>
<td>4, 5, 8, 10, 15</td>
<td>01-MAY-2001</td>
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<tr>
<td>29-JAN-2008</td>
<td>4, 8, 13</td>
<td>01-MAY-2007</td>
</tr>
<tr>
<td>29-JAN-2009</td>
<td>3, 4, 8, 10, 15</td>
<td>29-JAN-2008</td>
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<tr>
<td>24-JUN-2009</td>
<td>15</td>
<td>29-JAN-2009</td>
</tr>
<tr>
<td>03-OCT-2011</td>
<td>11</td>
<td>24-JUN-2009</td>
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<tr>
<td>03-AUG-2012</td>
<td>15</td>
<td>03-OCT-2011</td>
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</tbody>
</table>

Substance or Preparation: FLOGARD MS6209
SAFETY DATA SHEET


Product name: FYRQUEL EHC PLUS
Product ID: 7080
Revision date: 30/05/2016
Supersedes: 31/03/2014
Revision: 8

1. Identification of the substance & the company

Chemical name: Phenol, isobutenylated, phosphate (3:1)
Chemical family: Aryl phosphate
Type of product and use: Fire-resistant hydraulic fluid
Supplier: ICL-IP America Inc.
622 Emerson Road - Suite 600
St Louis, Missouri 63141, USA
Tel: (314)983-7884 Fax: (314)983-7607
E-mail: msdsinfo@icl-group.com
Emergency Telephone: Chemtrec: (800) 424-9360
Medical: PROSAR 1-888-875-1685 (24HRS)

2. Hazards identification

Product is not subject to classification according to GHS. No label elements required.

NFPA Ratings (Scale 0-4)
Health = 1, Fire = 1, Reactivity = 0

HMIS Ratings (Scale 0-4)
Health = 1, Fire = 1, Reactivity = 0

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triphenyl phosphate</td>
<td>115-86-6</td>
<td>0-4</td>
</tr>
<tr>
<td>t-Butylphenyl diphenyl phosphate</td>
<td>56803-37-3</td>
<td>32-78</td>
</tr>
<tr>
<td>Bis(-butylphenyl)phenyl phosphate</td>
<td>55652-41-7</td>
<td>10-40</td>
</tr>
<tr>
<td>Tri-(butylphenyl) phosphate</td>
<td>78-33-1</td>
<td>0-10</td>
</tr>
</tbody>
</table>

This product can also be described as:
CAS No. 68937-40-8, Phenol, isobutenylated, phosphate (3:1)

4. First-aid measures

Eye contact: Holding the eyelids apart, flush eyes promptly with copious flowing water for at least 20 minutes. Get medical attention immediately.
SAFETY DATA SHEET

Product name: FYRQUEL EHC PLUS
Product id: 7080
Revision date: 30/05/2016
Supersedes: 31/03/2014
Revision: 8

Skin contact
Remove contaminated clothing. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Wash clothing before reuse. Get medical attention if irritation persists.

Inhalation
In case of mist inhalation or breathing fumes released from heated material, remove person to fresh air. Keep him quiet and warm. Apply artificial respiration if necessary and get medical attention immediately.

Ingestion
If swallowed, wash mouth thoroughly with plenty of water. Get medical attention immediately.

NOTE: Never give an unconscious person anything to drink

Symptoms / Effects, Acute and Delayed
No specific information available

Most important symptoms and effects, acute or delayed
None known

Notes to the physician
Treat symptomatically and supportively. No specific antidote.

5. Fire-fighting measures

Suitable extinguishing media
Use extinguishing media appropriate to surrounding fire conditions.

Unusual fire and explosion hazards
When heated to decomposition, may release poisonous and corrosive fumes of carbon dioxide, carbon monoxide and phosphorus oxides.

Fire fighting procedure
Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Contain runoff to prevent entry into water or drainage systems.

6. Accidental release measures

Personal precautions
Wear appropriate safety clothing and eye/face protection (see Section 8)

Methods for cleaning up
Soak up with sand or other suitable absorbent and dispose of as solid waste. Collect in suitable and properly labeled containers. Ventilate area and wash spill site if material pickup is complete.

Environmental precautions
Prevent product from entering drains, ditches and rivers.
SAFETY DATA SHEET

7. Handling and storage

Handling
Avoid bodily contact. Keep containers tightly closed.

Storage
Store in a dry, cool, well-ventilated area away from incompatible materials (see "materials to avoid"). Maximum recommended storage temperature of 50°C (122°F) Store above 4.4°C (40°F) for improved pumping rates. Temperatures between 27 - 37°C (80 - 100°F) provide good flow rates.

8. Exposure controls / personal protection

Exposure Limits:

<table>
<thead>
<tr>
<th>Components</th>
<th>ACGIH-TLV Data</th>
<th>OSHA (PEL) Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triphenyl phosphate</td>
<td>3 mg/m³</td>
<td>3 mg/m³</td>
</tr>
<tr>
<td>l-Butylphenyl diphenyl phosphate</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>Diis(t-butyphenyl)phenyl phosphate</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>tris(t-butyphenyl)phosphate</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

Ventilation requirements
Ventilation must be sufficient to maintain atmospheric concentration below recommended exposure limit.

Personal protective equipment:
- Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment
- Hand protection: Neoprene gloves
- Eye protection: Chemical splash goggles and/or face shield if splash hazard exists
- Skin and body protection: Body covering clothes and boots

Hygiene measures
Do not eat, smoke or drink where material is handled, processed or stored. Wash hands thoroughly after handling and before eating or smoking. Safety shower and eye bath should be provided.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>-21°C</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>&gt;400°C (762mmHg)</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt;245°C (&gt;475°F) (closed cup)</td>
</tr>
<tr>
<td>Evaporation rate (ether=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammable/Explosion limits</td>
<td>Not flammable/Not explosive</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>1.08x10(-3)Pa (20°C)</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>Product name</th>
<th>FYRQUEL EHC PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Id</td>
<td>7080</td>
</tr>
<tr>
<td>Revision date</td>
<td>30/05/2016</td>
</tr>
<tr>
<td>Supersedes</td>
<td>31/03/2014</td>
</tr>
</tbody>
</table>

| Density               | 1.16-1.18 g/mL (25°C)  |
| Solubility:           |                        |
| - Solubility in water | 121 µg/l (20°C)        |
| Partition coefficient | Log Pow : 5.61          |
| Auto-Ignition temperature | Not self-ignitable   |
| Viscosity             | 42-46 cSt (40°C)       |
| Ignition temperature  | 593°C (1100°F)         |
| Explosive properties  | There are no chemical groups associated with explosive properties present in the molecule |
| Oxidising properties  | The structure indicates non oxidizing properties |

10. Stability and reactivity

Reactivity: No reactive hazards known/expected.
Stability: Stable under normal conditions.
Possibility of hazardous reactions: Not expected to occur.
Conditions to avoid: Heating above decomposition temperature.
Materials to avoid: Strong oxidizers, strong acids and strong alkalis.
Hazardous decomposition products: Phosphorus oxides Carbon dioxide and carbon monoxide.

11. Toxicological information

Note: The toxicological data refer to a similar product.

Acute toxicity:
- Rat oral LD50 > 5000 mg/kg
- Rabbit dermal LD50 > 2000 mg/kg
- Rat Inhalation LC50 > 0.4 mg/l
- Dermal irritation (rabbit) Not irritant
- Eye irritation (rabbit) Not irritant
Dermal sensitization: Not a sensitizer
Mutagenicity: Not mutagenic by the Ames Test and by mouse lymphoma assay.
Negative in chromosome aberration and sister chromatid exchange tests in mouse lymphoma cells.
**SAFETY DATA SHEET**


<table>
<thead>
<tr>
<th>Product name</th>
<th>FYRQUEL EHC PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product id</td>
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<td>Supersedes</td>
<td>31/03/2014</td>
</tr>
<tr>
<td>Revision:</td>
<td>8</td>
</tr>
</tbody>
</table>

### Carcinogenicity
- Not classified by IARC
- Not included in NTP 13th Report on Carcinogens
- Not classified as a carcinogen by USA OSHA

### Reproductive Toxicity
- Butylated triphenyl phosphate did not demonstrate reproductive toxicity. In a rat reproduction study, male and female animals received either 50, 250 or 1000 mg/kg/day for several weeks after which they mated. There was no reproductive toxicity observed at any dose level. Diagnostic pathology confirmed no alterations to the reproductive organs. There was no effect on mating index, litter size, survival of the offspring or on any other measured parameter.

### Teratogenicity
- Not teratogenic when administered orally up to 1000 mg/kg

### Specific Target Organ Toxicity (STOT)

<table>
<thead>
<tr>
<th>Specific Target Organ Toxicity</th>
<th>NOAEL 107.5 mg/kg bw/day (90 days oral, male rat)</th>
<th>NOAEL 124.8 mg/kg bw/day (90 days oral, female rat)</th>
</tr>
</thead>
</table>

### Aspiration Hazard
- Not expected to occur

### Neurotoxicity
- No signs of acute delayed neurotoxicity when administered orally to hens at 11.7 g/kg

### Ecological Information

<table>
<thead>
<tr>
<th>Aquatic Toxicity</th>
<th>No effects on aquatic organisms occurred at concentrations up to the substances water solubility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradation</td>
<td>Readily biodegradable</td>
</tr>
<tr>
<td>Bioaccumulative Potential</td>
<td>Not bioaccumulative</td>
</tr>
<tr>
<td>Mobility in Soil</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Note</td>
<td>Not considered to be PBT or vPvB</td>
</tr>
</tbody>
</table>

### Disposal Considerations

<table>
<thead>
<tr>
<th>Waste Disposal</th>
<th>Observe all federal, state and local environmental regulations when disposing of this material.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposal of Packaging</td>
<td>Dispose of in a safe manner in accordance with local/national regulations.</td>
</tr>
</tbody>
</table>

### Transportation Information

<table>
<thead>
<tr>
<th>DOT</th>
<th>Not regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMDG</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>
## 15. Regulatory Information

**USA**

Reported in the EPA TSCA Inventory.

- **SARA 313**
  This product does not contain a chemical listed at or above de minimis concentrations

- **Massachusetts Right-to-Know**
  Hazardous Substances list
  Listed (Triphenyl phosphate)

- **New Jersey Right-to-Know**
  Hazardous Substances list
  Listed (Triphenyl phosphate)

- **Pennsylvania Right-to-Know**
  Hazardous Substances list
  Listed (Triphenyl phosphate)

- **Rhode Island Right-to-Know**
  Hazardous Substances list
  Listed (Triphenyl phosphate)

- **California-Prop 65**
  This product does not contain any ingredient known to the State of California to cause cancer or reproductive toxicity as listed under the State drinking Water and Toxic Enforcement Act of 1986.

**Waste Classifications**

This material does not meet RCRA's characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40CFR 261.33.

**Canada**

Listed in DSL

**WHMIS hazard class**

Non-controlled

**EU**

Reported in EINECS

**EC No.**

939-505-4

**Japan**

Listed in ENCS

**Australia**

Listed in AICS

**New Zealand Inventory**

Listed in NZIoC

**China**

- **China inventory**
  Listed in IECSC

**Korea**

Listed in ECL

**Taiwan**

Listed

**Philippines**

Listed in PICCS
SAFETY DATA SHEET


<table>
<thead>
<tr>
<th>Product name</th>
<th>FYRQUEL EHC PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product id</td>
<td>7080</td>
</tr>
<tr>
<td>Revision date</td>
<td>30/06/2016</td>
</tr>
<tr>
<td>Supersedes</td>
<td>31/03/2014</td>
</tr>
</tbody>
</table>

16. Other Information

This data sheet contains changes from the previous version in section(s) 1, 3, 8, 11, 12, 15

Health, Safety & Environment Policy

We will strive to ensure that our operations and products meet the needs of the present global community without compromising the ability of future generations to meet their needs. We accept that the success of our business is dependent on the supply of products and services that will benefit society whilst ensuring human safety and protection of the environment and natural resources. Within the framework of our commitment to the Responsible Care program, we will provide a healthy and safe work environment for employees and will responsibly manage our products at all stages of their life cycle in order to protect human health and the environment whilst maintaining high production standards of operation.

TO MEET THIS COMMITMENT WE WILL: Comply with or exceed applicable national and international regulatory requirements and other requirements to which we subscribe. Communicate openly and actively encourage dialogue with employees, customers and community concerning our products and operations. Implement documented management systems consistent with and for promotion of the Responsible Care ethics.

Develop and supply products that can be manufactured, transported, used and disposed of safely whilst best meeting the needs of our customers. Regularly assess, continually improve and responsibly manage health, safety and environmental risks associated with products and processes throughout their life-cycles. Share knowledge and expertise with others and seek to learn from and incorporate improved practices into our own operations.

Educate and train employees, contractors and customers to improve their HSE performance. Communicate up-to-date information to enable our workers, customers and other interested parties to handle our products in a safe and environmentally responsible manner. Endeavor to work with customers, suppliers, distributors, and contractors to foster the safe use, transport and disposal of our chemicals. Support Product Stewardship programs in cooperation with customers, distributors and transporters.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ICL-IP America Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its safety and suitability for their purposes prior to use. In no event will ICL-IP America Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE, ARE MADE HEREBY WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Prepared by
HERA Division
Telephone: +972-8-6297835
Telefax: +972-8-6297832
www.icl-ip.com

End of safety data sheet
1. Identification

Product Name: HIPERF QT 2PK ZINC COLD GALV COMPOUND
Revision Date: 12/29/2016

Product Identifier: 206194T
Supercedes Date: 9/10/2014

Product Use/Class: Cold Galvanizing Compound/High Performance Epoxy Ester
Manufacturer: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL  60061
USA

Supplier: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL  60061
USA

Preparer: Regulatory Department

Emergency Telephone: 24 Hour Hotline: 847-367-7700

2. Hazard Identification

Classification

Symbol(s) of Product

Signal Word
Danger

Possible Hazards
87% of the mixture consists of ingredient(s) of unknown acute toxicity.

GHS HAZARD STATEMENTS
Flammable Liquid, category 3 H226 Flammable liquid and vapour.
STOT, repeated exposure, category 1 H372 Causes damage to organs through prolonged or repeated exposure.
Skin Sensitizer, category 1 H317 May cause an allergic skin reaction.

GHS LABEL PRECAUTIONARY STATEMENTS
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378 In case of fire: Use alcohol film forming foam, carbon dioxide, dry chemical, dry sand to extinguish.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local, regional and national regulations.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash hands thoroughly after handling.
P314 Get medical advice/attention if you feel unwell.
P272 Contaminated work clothing should not be allowed out of the workplace.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P321 For specific treatment see label

GHS SDS PRECAUTIONARY STATEMENTS
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P270 Do not eat, drink or smoke when using this product.
P363 Wash contaminated clothing before reuse.

3. Composition/Information On Ingredients

HAZARDOUS SUBSTANCES

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Wt. % Range</th>
<th>GHS Symbols</th>
<th>GHS Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>75-100</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Hydrotreated Light Distillate</td>
<td>64742-47-8</td>
<td>2.5-10</td>
<td>GHS08</td>
<td>H304</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
<td>2.5-10</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Stoddard Solvent</td>
<td>8052-41-3</td>
<td>1.0-2.5</td>
<td>GHS08</td>
<td>H304-372</td>
</tr>
<tr>
<td>Zeolite</td>
<td>1318-02-1</td>
<td>0.1-1.0</td>
<td>GHS06</td>
<td>H331</td>
</tr>
<tr>
<td>Methyl Ethyl Ketoxime</td>
<td>96-29-7</td>
<td>0.1-1.0</td>
<td>GHS05-GHS06</td>
<td>H302-312-317-318-331</td>
</tr>
</tbody>
</table>

4. First-aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: If swallowed, get medical attention.

5. Fire-fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: No unusual fire or explosion hazards noted. Closed containers may explode when exposed to extreme heat due to buildup of steam. Keep containers tightly closed. Combustible liquid and vapor.

SPECIAL FIREFIGHTING PROCEDURES: Evacuate area and fight fire from a safe distance. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools.

7. Handling and Storage
HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.


8. Exposure Controls/Personal Protection

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Weight % Less Than</th>
<th>ACGIH TLV-TWA</th>
<th>ACGIH TLV-STEL</th>
<th>OSHA PEL-TWA</th>
<th>OSHA PEL-Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>85.0</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
</tr>
<tr>
<td>Hydrotreated Light Distillate</td>
<td>64742-47-8</td>
<td>10.0</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
<td>5.0</td>
<td>2 mg/m3</td>
<td>10 mg/m3</td>
<td>5 mg/m3</td>
<td>N.E.</td>
</tr>
<tr>
<td>Stoddard Solvent</td>
<td>8052-41-3</td>
<td>5.0</td>
<td>100 ppm</td>
<td>N.E.</td>
<td>500 ppm</td>
<td>N.E.</td>
</tr>
<tr>
<td>Zeolite</td>
<td>1318-02-1</td>
<td>5.0</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
</tr>
<tr>
<td>Methyl Ethyl Ketoxime</td>
<td>96-29-7</td>
<td>1.0</td>
<td>10 ppm</td>
<td>N.E.</td>
<td>N.E.</td>
<td>N.E.</td>
</tr>
</tbody>
</table>

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator’s use.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

9. Physical and Chemical Properties

Appearance: Liquid
Odor: Solvent Like
Relative Density: 3.386
Freeze Point, °C: N.D.
Solubility in Water: Negligible
Decomposition Temp., °C: N.D.
Boiling Range, °C: 149 - 537
Flammability: Supports Combustion
Evaporation Rate: Slower than Ether
Vapor Density: Heavier than Air

Physical State: Liquid
Odor Threshold: N.E.
P H: N.A.
Viscosity: N.D.
Partition Coefficient, n-octanol/water: N.D.
Explosive Limits, vol%: 0.8 - 6.0
Flash Point, °C: 38
Auto-ignition Temp., °C: N.D.
Vapor Pressure: N.D.

(See “Other information” Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid contact with strong acid and strong bases.
INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.
HAZARDOUS DECOMPOSITION: When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
STABILITY: This product is stable under normal storage conditions.

11. Toxicological information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Substance causes moderate eye irritation.
EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Substance may cause slight skin irritation.
EFFECTS OF OVEREXPOSURE - INHALATION: High gas, vapor, mist or dust concentrations may be harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Prolonged or
excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Irritating to the nose, throat and respiratory tract. Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES
The acute effects of this product have not been tested. Data on individual components are tabulated below:

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Vapor LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>64742-47-8</td>
<td>Hydrotreated Light Distillate</td>
<td>&gt;5000 mg/kg Rat</td>
<td>&gt;2000 mg/kg Rabbit</td>
<td>&gt;5000 mg/L Rat</td>
</tr>
<tr>
<td>1314-13-2</td>
<td>Zinc Oxide</td>
<td>&gt;5000 mg/kg Rat</td>
<td>N.I.</td>
<td>N.I.</td>
</tr>
<tr>
<td>1318-02-1</td>
<td>Zeolite</td>
<td>5000 mg/kg Rat</td>
<td>&gt;2000 mg/kg Rabbit</td>
<td>2.4 mg/L Rat</td>
</tr>
<tr>
<td>96-29-7</td>
<td>Methyl Ethyl Ketonoxime</td>
<td>930 mg/kg Rat</td>
<td>1100 mg/kg Rabbit</td>
<td>&gt;4.8 mg/L Rat</td>
</tr>
</tbody>
</table>

N.I. - No Information

12. Ecological Information
ECOLOGICAL INFORMATION: Product is a mixture of listed components.

13. Disposal Information
DISPOSAL INFORMATION: Dispose of material in accordance to local, state, and federal regulations and ordinances. Do not allow to enter waterways, wastewater, soil, storm drains or sewer systems.

14. Transport Information

<table>
<thead>
<tr>
<th>UN Number:</th>
<th>Domestic (USDOT)</th>
<th>International (IMDG)</th>
<th>Air (IATA)</th>
<th>TDG (Canada)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N.A.</td>
<td>1263</td>
<td>1263</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

Proper Shipping Name: Not Regulated Paint Paint Not Regulated

Hazard Class: N.A. 3 3 N.A.
Packing Group: N.A. III III N.A.
Limited Quantity: No Yes Yes No

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category
This product has been reviewed according to the EPA ‘Hazard Categories’ promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Sara Section 313:
This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
</tr>
</tbody>
</table>
**Toxic Substances Control Act:**

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Nonane</td>
<td>111-84-2</td>
</tr>
</tbody>
</table>

---

**16. Other Information**

**HMIS RATINGS**

Health: 3*  Flammability: 2  Physical Hazard: 0  Personal Protection: X

**NFPA RATINGS**

Health: 3  Flammability: 2  Instability: 0

**VOLATILE ORGANIC COMPOUNDS, g/L:** 361

**SDS REVISION DATE:** 12/29/2016

**REASON FOR REVISION:**

Product Composition Changed
Substance and/or Product Properties Changed in Section(s):
01 - Identification
02 - Hazard Identification
05 - Fire-fighting Measures
09 - Physical & Chemical Properties
15 - Regulatory Information
16 - Other Information
Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users’ consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.
SAFETY DATA SHEET

1. IDENTIFICATION

Product Name: Marathon Petroleum Regular Unleaded Gasoline
Synonym: Conventional Regular Unleaded Gasoline
Chemical Family: Complex Hydrocarbon Substance
Recommended Use: Fuel.
Use Restrictions: All others.

Supplier Name and Address:
MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070
Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous according to the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 1</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Aspiration toxicity</td>
<td>Category 1</td>
</tr>
<tr>
<td>Acute aquatic toxicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Chronic aquatic toxicity</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Hazards Not Otherwise Classified (HNOC)
Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger
EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Causes skin irritation
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause respiratory irritation
May cause drowsiness or dizziness
Toxic to aquatic life with long lasting effects

Appearance Clear or Colored Liquid
Physical State Liquid
Odor Strong Hydrocarbon

Precautionary Statements - Prevention
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
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not eat, drink or smoke when using this product
Do not breathe mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash hands thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
If exposed or concerned: Get medical attention
If ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
If SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.
Composition Information:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>86290-81-5</td>
<td>100</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>1-15</td>
</tr>
<tr>
<td>Xylene (mixed isomers)</td>
<td>1330-20-7</td>
<td>2-10</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>95-63-6</td>
<td>1-5</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>0.5-3.5</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>110-54-3</td>
<td>0-3</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100-41-4</td>
<td>0.5-2.0</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>0.1-0.5</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First Aid Measures

General advice
In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation:
Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Skin Contact:
Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact:
Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion:
Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.
Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Indication of any immediate medical attention and special treatment needed
NOTES TO PHYSICIAN:

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical
This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
- Sensitivity to Mechanical Impact: No.
- Sensitivity to Static Discharge: Yes.

Special protective equipment and precautions for firefighters
Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

NFPA:
- Health: 1
- Flammability: 3
- Instability: 0
- Special Hazards: -

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Protective Equipment:
Use personal protection measures as recommended in Section 8.

Emergency Procedures:
Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.

Environmental precautions:
Avoid release to the environment. Avoid subsoil penetration.
Methods and materials for containment:  
Contain liquid with sand or soil.

Methods and materials for cleaning up:  
Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:  
NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Use only non-sparking tools. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:  
Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area.

Incompatible materials  
Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
<table>
<thead>
<tr>
<th>Name</th>
<th>ACGIH TLV</th>
<th>OSHA PELS:</th>
<th>OSHA - Vacated PELs</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>300 ppm TWA 500 ppm STEL</td>
<td>-</td>
<td>300 ppm TWA 900 mg/m^3 TWA 500 ppm STEL 1500 mg/m^3 STEL</td>
<td>-</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>20 ppm TWA</td>
<td>TWA: 200 ppm Ceiling: 300 ppm</td>
<td>100 ppm TWA 375 mg/m^3 TWA 150 ppm STEL 560 mg/m^3 STEL</td>
<td>500 ppm</td>
</tr>
<tr>
<td>Xylene (mixed isomers) 1330-20-7</td>
<td>100 ppm TWA 150 ppm STEL</td>
<td>TWA: 100 ppm TWA: 435 mg/m^3</td>
<td>100 ppm TWA 435 mg/m^3 TWA 150 ppm STEL 655 mg/m^3 STEL</td>
<td>900 ppm</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene 95-63-6</td>
<td>25 ppm TWA</td>
<td>-</td>
<td>25 ppm TWA 125 mg/m^3 TWA</td>
<td>-</td>
</tr>
<tr>
<td>Benzene 71-43-2</td>
<td>0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route</td>
<td>TWA: 10 ppm (applies to industry segments exempt from the benzene standard at 29 CFR 1910.1028) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)</td>
<td>25 ppm Ceiling 1 ppm TWA 5 ppm STEL</td>
<td>500 ppm</td>
</tr>
<tr>
<td>n-Hexane 110-54-3</td>
<td>50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route</td>
<td>TWA: 500 ppm TWA: 1800 mg/m^3</td>
<td>50 ppm TWA 180 mg/m^3 TWA</td>
<td>1100 ppm</td>
</tr>
<tr>
<td>Ethylbenzene 100-41-4</td>
<td>20 ppm TWA</td>
<td>TWA: 100 ppm TWA: 435 mg/m^3</td>
<td>100 ppm TWA 435 mg/m^3 TWA 125 ppm STEL 545 mg/m^3 STEL</td>
<td>800 ppm</td>
</tr>
<tr>
<td>Naphthalene 91-20-3</td>
<td>10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route</td>
<td>TWA: 10 ppm TWA: 50 mg/m^3</td>
<td>10 ppm TWA 50 mg/m^3 TWA 15 ppm STEL 75 mg/m^3 STEL</td>
<td>250 ppm</td>
</tr>
</tbody>
</table>

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection: Use goggles or face-shield if the potential for splashing exists.

Skin and body protection: Use nitrile rubber, viton or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.

Respiratory protection: Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the established exposure limits. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Physical State: Liquid
Appearance: Clear or Colored Liquid
Color: Clear or Colored
Odor: Strong Hydrocarbon
Odor Threshold: No available data.

<table>
<thead>
<tr>
<th>Property</th>
<th>Values (Method)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Point / Freezing Point</td>
<td>No available data.</td>
</tr>
<tr>
<td>Initial Boiling Point / Boiling Range</td>
<td>32-225 °C / 90-437 °F</td>
</tr>
<tr>
<td>Flash Point</td>
<td>-45.5 °C / -50 °F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No available data.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammability Limit in Air (%)</td>
<td></td>
</tr>
<tr>
<td>Upper Flammability Limit:</td>
<td>7.6</td>
</tr>
<tr>
<td>Lower Flammability Limit:</td>
<td>1.4</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>403-776 mm Hg @ 100°F</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>3-4</td>
</tr>
<tr>
<td>Specific Gravity / Relative Density</td>
<td>0.70-0.77</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Negligible</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No available data.</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>2.13-4.5</td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>No available data.</td>
</tr>
<tr>
<td>pH:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>C.A. 257 °C / 495 °F</td>
</tr>
<tr>
<td>Kinematic Viscosity</td>
<td>No available data.</td>
</tr>
<tr>
<td>Dynamic Viscosity</td>
<td>No available data.</td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>No available data.</td>
</tr>
<tr>
<td>Softening Point</td>
<td>No available data.</td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>100%</td>
</tr>
<tr>
<td>Density</td>
<td>5.9-6.3 lbs/gal</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity: The product is non-reactive under normal conditions.

Chemical stability: The material is stable at 70°F, 760 mmHg pressure.

Possibility of hazardous reactions: None under normal processing.

Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive heat, sources of ignition, open flame.

Incompatible materials: Strong oxidizing agents.

Hazardous decomposition products: None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures:

Inhalation: Irritating to the respiratory system. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.

Eye contact: Causes mild eye irritation.
Skin contact

Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.

Ingestion

May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

### Acute Toxicological data

<table>
<thead>
<tr>
<th>Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline 86290-81-5</td>
<td>14000 mg/kg (Rat)</td>
<td>&gt; 2000 mg/kg (Rabbit)</td>
<td>&gt; 5.2 mg/L (Rat) 4 h</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>&gt; 2000 mg/kg (Rat)</td>
<td>8390 mg/kg (Rabbit)</td>
<td>12.5 mg/L (Rat) 4 h</td>
</tr>
<tr>
<td>Xylene (mixed isomers) 1330-20-7</td>
<td>&gt; 2000 mg/kg (Rat)</td>
<td>&gt; 2000 mg/kg (Rabbit)</td>
<td>&gt; 5.04 mg/L (Rat) 4 h</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene 95-63-6</td>
<td>3280 mg/kg (Rat)</td>
<td>&gt; 3160 mg/kg (Rabbit)</td>
<td>18,000 mg/m³ (Rat) 4 h</td>
</tr>
<tr>
<td>Benzene 71-43-2</td>
<td>&gt; 2000 mg/kg (Rat)</td>
<td>&gt; 5000 mg/kg (Rabbit)</td>
<td>&gt; 20 mg/l (Rat) 4 h</td>
</tr>
<tr>
<td>n-Hexane 110-54-3</td>
<td>15000 mg/kg (Rat)</td>
<td>3000 mg/kg (Rabbit)</td>
<td>48000 ppm (Rat) 4 h</td>
</tr>
<tr>
<td>Ethylbenzene 100-41-4</td>
<td>&gt; 2000 mg/kg (Rat)</td>
<td>&gt; 2000 mg/kg (Rabbit)</td>
<td>17.2 mg/L (Rat) 4 h</td>
</tr>
<tr>
<td>Naphthalene 91-20-3</td>
<td>490 mg/kg (Rat)</td>
<td>&gt; 2000 mg/kg (Rabbit)</td>
<td>&gt; 340 mg/m³ (Rat) 1 h</td>
</tr>
</tbody>
</table>

Delayed and immediate effects as well as chronic effects from short and long-term exposure
BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included a increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropin hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal
studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve
damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of consciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs & Symptoms  
Nausea, vomiting, signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Sensitization  
Not expected to be a skin or respiratory sensitizer.

Mutagenic effects  
May cause genetic defects.

Carcinogenicity  
Cancer designations are listed in the table below.

<table>
<thead>
<tr>
<th>Name</th>
<th>ACGIH (Class)</th>
<th>IARC (Class)</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>Confirmed animal carcinogen (A3)</td>
<td>Possibly Carcinogenic (2B)</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>Not Classifiable (A4)</td>
<td>Not Classifiable (3)</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Xylene (mixed isomers) 1330-20-7</td>
<td>Not Classifiable (A4)</td>
<td>Not Classifiable (3)</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene 95-63-6</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Benzene 71-43-2</td>
<td>Confirmed human carcinogen (A1)</td>
<td>Carcinogenic to humans (1)</td>
<td>Known to be human carcinogen</td>
<td>Known carcinogen</td>
</tr>
<tr>
<td>n-Hexane 110-54-3</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Ethylbenzene 100-41-4</td>
<td>Confirmed animal carcinogen (A3)</td>
<td>Possible human carcinogen (2B)</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Naphthalene 91-20-3</td>
<td>Confirmed animal carcinogen (A3)</td>
<td>Possible human carcinogen (2B)</td>
<td>Reasonably anticipated to be a human carcinogen</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

Reproductive toxicity  
Suspected of damaging fertility or the unborn child.
Specific Target Organ Toxicity (STOT) - single exposure
Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure
Not classified.

Aspiration hazard
May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity
This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

<table>
<thead>
<tr>
<th>Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline 86290-81-5</td>
<td>72-hr EC50 = 56 mg/l</td>
<td>96-hr LC50 = 11 mg/l</td>
<td>-</td>
<td>48-hr LC50 = 7.6 mg/l Daphnia magna</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout (static)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>72-hr EC50 = 12.5 mg/l</td>
<td>96-hr LC50 &lt;= 10 mg/l</td>
<td>-</td>
<td>48-hr EC50 = 5.46-9.83 mg/l Daphnia magna</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout</td>
<td></td>
<td>48-hr EC50 = 11.5 mg/l Daphnia magna (Static)</td>
</tr>
<tr>
<td>Xylene (mixed isomers) 1330-20-7</td>
<td>72-hr EC50 = 11 mg/l</td>
<td>96-hr LC50 = 8 mg/l</td>
<td>-</td>
<td>48-hr LC50 = 3.82 mg/l Daphnia magna</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene 95-63-6</td>
<td>-</td>
<td>96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)</td>
<td>-</td>
<td>48-hr EC50 = 6.14 mg/L Daphnia magna</td>
</tr>
<tr>
<td>Benzene 71-43-2</td>
<td>72-hr EC50 = 29 mg/l</td>
<td>96-hr LC50 = 5.3 mg/l</td>
<td>-</td>
<td>48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout (flow-through)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Hexane 110-54-3</td>
<td>-</td>
<td>96-hr LC50 = 2.5 mg/l</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ethylbenzene 100-41-4</td>
<td>72-hr EC50 = 1.7-7.6 mg/l</td>
<td>96-hr LC50 = 4 mg/L Rainbow trout (static)</td>
<td>-</td>
<td>48-hr EC50 = 1.4 mg/L Daphnia magna</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naphthalene 91-20-3</td>
<td>-</td>
<td>96-hr LC50 = 0.91-2.82 mg/l</td>
<td>-</td>
<td>48-hr LC50 = 1.6 mg/l Daphnia magna</td>
</tr>
<tr>
<td></td>
<td>Algae</td>
<td>Rainbow trout (static)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and degradability
Expected to be inherently biodegradable.

Bioaccumulation
Has the potential to bioaccumulate.

Mobility in soil
May partition into air, soil and water.

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.
Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):
- UN Proper shipping name: Gasoline
- UN/Identification No: UN 1203
- Transport Hazard Class(es): 3
- Packing group: II

TDG (Canada):
- UN Proper shipping name: Gasoline
- UN/Identification No: UN 1203
- Transport Hazard Class(es): 3
- Packing group: II

15. REGULATORY INFORMATION

US Federal Regulatory Information:
- US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>NA</td>
</tr>
<tr>
<td>Toluene</td>
<td>NA</td>
</tr>
<tr>
<td>Xylene (mixed isomers)</td>
<td>NA</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>NA</td>
</tr>
<tr>
<td>Benzene</td>
<td>NA</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>NA</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>NA</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>NA</td>
</tr>
</tbody>
</table>

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA - Hazardous Substances and their Reportable Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>NA</td>
</tr>
<tr>
<td>Toluene</td>
<td>1000 lb final RQ 454 kg final RQ</td>
</tr>
<tr>
<td>Xylene (mixed isomers)</td>
<td>100 lb final RQ 45.4 kg final RQ</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>NA</td>
</tr>
<tr>
<td>Benzene</td>
<td>10 lb final RQ 4.54 kg final RQ</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>5000 lb final RQ 2270 kg final RQ</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>1000 lb final RQ 454 kg final RQ</td>
</tr>
</tbody>
</table>
SARA:
The following EPA hazard categories apply to this product:

- Acute Health Hazard
- Chronic Health Hazard
- Fire Hazard

SARA Section 313:
This product may contain component(s), which if in exceedance of the de minimis threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA 313 Emission reporting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>None</td>
</tr>
<tr>
<td>Toluene</td>
<td>1.0 % de minimis concentration</td>
</tr>
<tr>
<td>Xylene (mixed isomers)</td>
<td>1.0 % de minimis concentration</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>None</td>
</tr>
<tr>
<td>Benzene</td>
<td>0.1 % de minimis concentration</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>1.0 % de minimis concentration</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>0.1 % de minimis concentration</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>0.1 % de minimis concentration</td>
</tr>
</tbody>
</table>

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Gasoline:
- Louisiana Right-To-Know: Not Listed.
- California Proposition 65: Not Listed.
- New Jersey Right-To-Know: SN 0957
- Pennsylvania Right-To-Know: Present
- Massachusetts Right-To Know: Present
- Florida Substance List: Not Listed.
- Rhode Island Right-To-Know: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed.
- California - Regulated Carcinogens: Not Listed.
- Pennsylvania RTK - Special Hazardous Substances:
  - Substances: Carcinogen; Flammable - third degree
  - SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
- New Jersey - Special Hazardous Substances:
  - Carcinogen; Flammable - third degree; Teratogen
  - SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)

Toluene:
- Louisiana Right-To-Know: Not Listed.
- California Proposition 65: Developmental toxicity, initial date 1/1/91
  Female reproductive toxicity, initial date 8/7/09
  SN 1866
- New Jersey Right-To-Know: Environmental hazard
- Pennsylvania Right-To-Know: Present
- Massachusetts Right-To Know: Present
- Florida Substance List: Not Listed.
- Rhode Island Right-To-Know: Present
- Massachusetts Extraordinarily Hazardous Substances:
  - Substances: Toxic (skin); Flammable (skin)
  - SN 1050 Annual usage threshold
- California - Regulated Carcinogens: Not Listed.
- Pennsylvania RTK - Special Hazardous Substances:
  - Not Listed.
  - Not Listed.
New Jersey - Environmental Hazardous Substances List: SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants: Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances: 1000 lb RQ (air); 1 lb RQ (land/water)

Xylene (mixed isomers)
Louisiana Right-To-Know: Not Listed.
California Proposition 65: Not Listed.
New Jersey Right-To-Know: SN 2014
Pennsylvania Right-To-Know: Environmental hazard
Massachusetts Right-To-Know: Present
Florida Substance List: Not Listed.
Rhode Island Right-To-Know: Toxic (skin); Flammable (skin)
Massachusetts Extraordinarily Hazardous Substances: Not Listed.
California - Regulated Carcinogens: Not Listed.
Pennsylvania RTK - Special Hazardous Substances: Not Listed.
New Jersey - Special Hazardous Substances: Flammable - third degree
New Jersey - Environmental Hazardous Substances List: SN 2014 TPQ: 500 lb

1,2,4-Trimethylbenzene
Louisiana Right-To-Know: Not Listed.
California Proposition 65: Not Listed.
New Jersey Right-To-Know: SN 1929
Pennsylvania Right-To-Know: Present
Massachusetts Right-To-Know: Present
Florida Substance List: Not Listed.
Rhode Island Right-To-Know: Toxic
Massachusetts Extraordinarily Hazardous Substances: Not Listed.
California - Regulated Carcinogens: Not Listed.
Pennsylvania RTK - Special Hazardous Substances: Not Listed.
New Jersey - Special Hazardous Substances: Not Listed.
New Jersey - Environmental Hazardous Substances List: Not Listed.

Benzene
Louisiana Right-To-Know: Not Listed.
California Proposition 65: Carcinogen, initial date 2/27/87
Developmental toxicity, initial date 12/26/97
Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know: SN 0197
Pennsylvania Right-To-Know: Environmental hazard; Special hazardous substance
Massachusetts Right-To-Know: Carcinogen; Extraordinarily hazardous
Florida Substance List: Not Listed.
Rhode Island Right-To-Know: Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List: 100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances: Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens: Not Listed.
Pennsylvania RTK - Special Hazardous Substances: Present
New Jersey - Special Hazardous Substances: Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List: SN 0197 TPQ: 500 lb
<table>
<thead>
<tr>
<th>Substance</th>
<th>Illinois - Toxic Air Contaminants</th>
<th>New York - Reporting of Releases Part 597 - List of Hazardous Substances:</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Hexane</td>
<td>Present</td>
<td>10 lb RQ (air); 1 lb RQ (land/water)</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>Not Listed.</td>
<td>1 lb RQ (air); 1 lb RQ (land/water)</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>Not Listed.</td>
<td>100 lb RQ (air); 1 lb RQ (land/water)</td>
</tr>
</tbody>
</table>

**Louisiana Right-To-Know:**
- Not Listed.

**California Proposition 65:**
- Carcinogen, initial date 6/11/04
- SN 0851

**Pennsylvania Right-To-Know:**
- Environmental hazard
- SN 1322 SN 3758

**Massachusetts Right-To-Know:**
- Present
- SN 1322 TPQ: 500 lb

**Florida Substance List:**
- Not Listed.

**Rhode Island Right-To-Know:**
- Toxic; Flammable

**Michigan Critical Materials Register List:**
- Not Listed.

**Massachusetts Extraordinarily Hazardous Substances:**
- Not Listed.

**California - Regulated Carcinogens:**
- Not Listed.

**Pennsylvania RTK - Special Hazardous Substances:**
- Not Listed.

**New Jersey - Special Hazardous Substances:**
- Flammable - third degree
- SN 1340 TPQ: 500 lb

**New Jersey - Environmental Hazardous Substances List:**
- Carcinogen; flammable - Third degree
- SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)

**Illinois - Toxic Air Contaminants:**
- Present

**New York - Reporting of Releases Part 597 - List of Hazardous Substances:**
- Present
- 100 lb RQ (air); 1 lb RQ (land/water)

**Massachusetts Extraordinarily Hazardous Substances:**
- Not Listed.

**California - Regulated Carcinogens:**
- Not Listed.

**Pennsylvania RTK - Special Hazardous Substances:**
- Not Listed.

**New Jersey - Special Hazardous Substances:**
- Carcinogen

**New Jersey - Environmental Hazardous Substances List:**
- SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)

**Illinois - Toxic Air Contaminants:**
- Present

**New York - Reporting of Releases Part 597 - List of Hazardous Substances:**
- Present
- 100 lb RQ (air); 1 lb RQ (land/water)
Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: "This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations."

<table>
<thead>
<tr>
<th>Name</th>
<th>Canada - WHMIS: Classifications of Substances:</th>
<th>Canada - WHMIS: Ingredient Disclosure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>B2,D2A,D2B</td>
<td>0.1%</td>
</tr>
<tr>
<td>Toluene</td>
<td>B2,D2A,D2B</td>
<td>0.1%</td>
</tr>
<tr>
<td>Xylene (mixed isomers)</td>
<td>B2,D2A,D2B</td>
<td>m-, o-isomers 1.0%; p-isomer 0.1%</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>B3</td>
<td>1</td>
</tr>
<tr>
<td>Benzene</td>
<td>B2,D2A,D2B</td>
<td>0.1%</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>B2,D2A,D2B</td>
<td>1%</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>B2,D2A,D2B</td>
<td>0.1%</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>B4,D2A</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

NOTE: Not Applicable.

## 16. OTHER INFORMATION

Prepared By: Toxicology and Product Safety
Revision Date: 05/14/2015

Revision Note: Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
MATERIAL SAFETY DATA SHEET

UNLEADED GASOLINE (UNBRANDED)

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product.

1. PRODUCT and COMPANY IDENTIFICATION

Material Identity
Unleaded Gasoline (Unbranded)

Trade Name(s)
None

Other Name(s)
Unleaded Motor Vehicle Gasoline, Unleaded Premium Gasoline, Unleaded Regular Gasoline or Petrol, Clear Gasoline.

Chemical Description
Petroleum Hydrocarbons

Manufacturer's Address
BP West Coast Products LLC
Carson Business Unit
1801 E. Sepulveda Boulevard
Carson, California 90749-6210

BP West Coast Products LLC
Cherry Point Business Unit
4519 Grandview Road
Blaine, Washington 98230

Telephone Numbers
Emergency Health Information: 1 (800) 447-8735
Emergency Spill Information: 1 (800) 424-9300 CHEMTREC (USA)
Other Product Information: 1 (866) 4BP-MSDS
(866-427-6737 Toll Free - North America)
email: bpcares@bp.com
Customer Service: 1 (800) 322-3736 INFO

2. COMPONENTS and EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>% Composition By Volume</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>Units</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>GASOLINE</td>
<td>8006-61-9</td>
<td>EQ 100</td>
<td>500</td>
<td>500</td>
<td>ppm</td>
<td>STEL TWA</td>
</tr>
<tr>
<td>which contains:</td>
<td></td>
<td></td>
<td>300</td>
<td>300</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td>BENZENE</td>
<td>71-43-2</td>
<td>AP 1 to 5</td>
<td>2.5</td>
<td>5</td>
<td>ppm</td>
<td>STEL TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>1</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>110-82-7</td>
<td>LT 2</td>
<td>400</td>
<td>N/AP</td>
<td>ppm</td>
<td>STEL TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>300</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td>ETHYLBENZENE</td>
<td>100-41-4</td>
<td>AP 1 to 3</td>
<td>125</td>
<td>125</td>
<td>ppm</td>
<td>STEL TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>100</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td>HEXANE (N-HEXANE)</td>
<td>110-54-3</td>
<td>AP 2 to 5</td>
<td>50</td>
<td>50</td>
<td>ppm</td>
<td>TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOLUENE</td>
<td>108-88-3</td>
<td>AP 7 to 14</td>
<td>N/AP</td>
<td>150</td>
<td>ppm</td>
<td>STEL TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>100</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRIMETHYL BENZENE (ALL ISOMERS)</td>
<td>25551-13-7</td>
<td>LT 5</td>
<td>25</td>
<td>25</td>
<td>ppm</td>
<td>TWA</td>
</tr>
<tr>
<td>1,2,4-TRIMETHYLBENZENE</td>
<td>95-63-6</td>
<td>AP 1 to 4</td>
<td>25</td>
<td>25</td>
<td>ppm</td>
<td>TWA</td>
</tr>
</tbody>
</table>

Print Date: 05/19/2003

***FOR "DISCLAIMER OF LIABILITY", SEE THE STATEMENT ON LAST PAGE***
2,2,4 TRIMETHYLPENTANE
540-84-1 AP 3 to 10 N/AP N/AP

XYLENE
1330-20-7 AP 8 to 15 150 150 ppm STEL TWA

which may contain:

ETHANOL
64-17-5 AP 0 to 10 1000 1000 ppm TWA

METHYL TERTIARY BUTYL ETHER (MTBE) (4)
1634-04-4 AP 0 to 15 40 N/AP ppm TWA

1 Carcinogen displayed after Component Name. Listed by (1) NTP, (2) IARC, (3) OSHA, (4) Other
2 See Abbreviations on last page
3 The OSHA exposure limits were changed in 1993 due to a federal court ruling. ARCO has chosen to list the 1989 OSHA exposure limits in this document as they are generally more stringent and therefore more protective than the current exposure limits. (Refer to 29 CFR 1910.1000).

3. HAZARD IDENTIFICATION

IMMEDIATE HAZARDS

DANGER

HIGHLY FLAMMABLE! OSHA/NFPA Class IB flammable liquid. Keep away from heat, sparks, and open flame.

Never siphon gas by mouth. Harmful if swallowed. Contains petroleum distillates.

ASPIRATION HAZARD! If swallowed, do not induce vomiting since aspiration into the lungs may cause chemical pneumonia. Obtain prompt medical attention.

Prolonged or repeated liquid contact may cause irritation. High vapor concentrations (greater than 1000 ppm) may cause irritation to eyes and respiratory system and may cause dizziness and other nervous system effects.

Generally, human exposures to gasoline are considerably lower than levels which have caused adverse health effects in animal studies or human case studies of gasoline misuse or abuse (such as gasoline sniffing). Adverse health effects are not expected to occur at exposure levels typically encountered in the use of gasoline as a motor fuel.

Avoid breathing vapors or mists. Use only with adequate ventilation. Use as a motor fuel only. Do not use as a cleaning solvent, thinner or for other non-motor fuel use.

Wash hands thoroughly after handling.

ACUTE HEALTH HAZARDS

Routes of Exposure

Inhalation (Primary)

Exposures at airborne concentrations well above the recommended exposure limits in Section 2 may cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, confusion, loss of coordination, fatigue, nausea, labored breathing and irregular heartbeats. May lead to unconsciousness, convulsions, and possibly death.

Eye Contact

May cause some transitory eye irritation but not expected to cause prolonged or significant eye irritation.

Skin Contact

Moderate skin irritation may occur upon short-term exposure. May be absorbed and contribute to the acute inhalation health effects (see above).

Ingestion

ASPIRATION HAZARD! This material can enter the lungs during swallowing or vomiting and may cause acute lung inflammation and damage which in severe cases may be fatal. Ingestion may cause irritation of the mouth, throat and gastrointestinal tract leading to nausea, vomiting, diarrhea, and restlessness.

May cause headache, dizziness, drowsiness, confusion, loss of coordination, fatigue, nausea and labored breathing. May lead to unconsciousness, convulsions, and possibly death.
Summary of Chronic Hazards and Special Health Effects

Exposures at airborne concentrations well above the recommended exposure limits in Section 2 may aggravate medical conditions such as chronic respiratory diseases, cardiovascular disease, skin diseases, or blood disorders.

Prolonged/repeated exposures above the recommended exposure limits via skin contact, inhalation or ingestion of this material may result in adverse dermal or systemic effects. Avoid prolonged or repeated overexposure.

Contains benzene, a chemical known to cause cancer in humans. Repeated and prolonged overexposure to benzene vapors may cause leukemia, aplastic anemia, or other blood disorders, immunotoxicity, reproductive harm or fetal toxicity.

Neurotoxic effects have been associated with n-hexane, a component of this material upon prolonged or repeated overexposure.

Generally, human exposures to gasoline are considerably lower than levels which have caused adverse health effects in animal studies or human case studies of gasoline misuse or abuse (such as gasoline sniffing). Adverse health effects are not expected to occur at exposure levels typically encountered in the use of gasoline as a motor fuel. See Section 11 for Additional Toxicological Information.

4. EMERGENCY and FIRST AID

Inhalation
Immediately move personnel to area with fresh air. For respiratory distress, give oxygen, rescue breathing or administer CPR (cardiopulmonary resuscitation). Obtain prompt medical attention.

Eye Contact
Flush with clean, low-pressure water for at least 15 minutes, occasionally lifting the eyelids. If pain or redness is present after flushing, obtain medical attention.

Skin Contact
Immediately remove contaminated clothing. Wash affected skin thoroughly with soap and water. If irritation persists, obtain medical attention.

Ingestion
Do not induce vomiting. Obtain prompt medical attention.

ASPIRATION HAZARD: This material can enter the lungs during swallowing or vomiting and may cause lung inflammation and damage.

Emergency Medical Treatment Procedures
See above procedures.

5. FIRE and EXPLOSION

<table>
<thead>
<tr>
<th>Flash Point (Method)*</th>
<th>AP -45°F **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoignition Temperature (Method)*</td>
<td>AP 536°F **</td>
</tr>
<tr>
<td>Flammable Limits (% Vol. in Air)*</td>
<td>Lower 1.4</td>
</tr>
<tr>
<td></td>
<td>Upper 7.6</td>
</tr>
</tbody>
</table>

Fire and Explosion Hazards
HIGHLY FLAMMABLE! Vaporizes easily at normal and below normal temperatures. When mixed with air in certain proportions and exposed to an ignition source, these vapors can burn in the open or explode in confined spaces. Being heavier than air, flammable vapors may travel long distances along the ground before reaching a point of ignition and flashing back.

May accumulate static electricity.

Liquid floats on water and may travel to a source of ignition and spread fire.

“Empty” containers retain liquid and vapor residues and, if exposed to source of ignition, may explode.
Extinguishing Media
Foam, Water fog, Dry chemical, Carbon Dioxide (CO2)
Water and water spray may cool the fire but may not extinguish the fire.

Special Firefighting Procedures
For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of combustion products and oxygen deficiencies. If firefighters cannot work upwind to the fire, respiratory protective equipment must be worn. Cool tanks and containers exposed to fire with water.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released
Eliminate all potential sources of ignition. Handling equipment and tools should be grounded to prevent sparking. Contain spill, evacuate non-essential personnel, and safely stop flow. Blanket spill with foam or use water fog to reduce vapor cloud. On hard surfaces, spilled material may create a slipping hazard. Equip cleanup crews with proper protective equipment (as specified in Section 8) and advise of hazards. Clean up by recovering as much spilled or contaminated materials as possible and placing into closed containers. Consult with an environmental professional for the federal, state and local cleanup and reporting requirements for spills and releases.

7. HANDLING and STORAGE

Handling, Storage and Decontamination Procedures
Avoid exposure to liquid and gas vapors. Odor is not a reliable warning of overexposure. Use only with adequate ventilation.

Keep away from sources of heat, flames, sparks or other ignition sources. Storage and use areas should be “No Smoking” areas. Containers should be bonded and grounded for transfers to avoid static sparks.

Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage warehouse, room or cabinet. Separate from oxidizing materials.

Filling Portable Containers (less than 10 gallons) - to minimize static spark hazard:
1. Fill only metal containers or those approved to hold gasoline;
2. Place containers on the ground while dispensing fuel;
3. Keep hose nozzle in contact with the approved container during the entire filling process.

DO NOT fill any portable container in or on a vehicle.

“Empty” containers retain liquid and vapor residues and can be dangerous. Do not pressurize, cut, weld, drill, grind or expose to heat, flame, sparks, static electricity, or other sources of ignition containers with ANY residue; they may explode and cause injury or death.

For determining National Electrical Code (NEC) Hazardous (Classified) Location requirements for electrical installation, consider this material Class 1, Group D.

KEEP OUT OF REACH OF CHILDREN!

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls
Where possible, use adequate ventilation to keep vapor and mist concentrations of this material below the occupational exposure limits shown in Section 2. Electrical equipment should comply with National Electrical Code (NEC) standards (see Section 7).

Respiratory
A NIOSH/MSHA-approved air-purifying respirator with an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations may exceed the exposure limits in Section 2. Consult a health and safety professional for guidance in respirator selection. Respirator use should comply with OSHA 29 CFR 1910.134.
**CAUTION:** The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of the air-purifying respirator.

**Eyes**

Eye protection should be worn. If there is potential for splashing or spraying, chemical protective goggles and a face shield should be worn. If contact lenses are worn, consult an eye specialist or a safety professional for additional precautions. Suitable eye wash water should be available in case of eye contact with this material.

**Skin**

Avoid prolonged and/or repeated skin contact. If conditions or frequency of use make significant contact likely, clean and impervious clothing such as gloves, apron, boots and facial protection should be worn. Nitrile and Viton protective clothing material is recommended.

Non-impervious clothing which becomes contaminated with this material should be removed promptly and not reworn until the material is effectively removed from the clothing.

**Other Hygienic and Work Practices**

Use good personal hygiene practices. In case of skin contact, wash with mild soap and water or a waterless hand cleaner. Wash hands and other exposed areas thoroughly before eating, drinking, smoking, or using toilet facilities.

### 9. PHYSICAL and CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>AP 35°F to 437°F</td>
</tr>
<tr>
<td>Viscosity Units, Temp. (Method)</td>
<td>N/AP</td>
</tr>
<tr>
<td>Dry Point</td>
<td>AP 430°F</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/AP</td>
</tr>
<tr>
<td>Vapor Pressure, Temp. (Method)</td>
<td>AP 5 to 15 at 100°F (REID-PSIA)</td>
</tr>
<tr>
<td>Volatile Characteristics</td>
<td>Appreciable</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1 @ 39.2°F):</td>
<td>AP 0.7 to 0.8</td>
</tr>
<tr>
<td>Vapor Sp. Gr. (Air = 1.0 @ 60°F - 90°F):</td>
<td>AP 4</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Slight</td>
</tr>
<tr>
<td>PH</td>
<td>N/AP</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>Colorless to straw-colored liquid; petroleum naphtha odor.</td>
</tr>
<tr>
<td>Other Physical and Chemical Properties:</td>
<td>Vapor pressure will vary seasonally in compliance with industry standards and federal and state regulations.</td>
</tr>
</tbody>
</table>

### 10. STABILITY and REACTIVITY

**Stability**

Stable

**Hazardous Polymerization**

Not expected to occur.

**Other Chemical Reactivity**

Reacts with oxidizing materials.

**Conditions to Avoid**

Heat, sparks, flame, and build up of static electricity.

**Materials to Avoid**

Halogens, strong acids, alkalies, and oxidizers.

**Hazardous or Decomposition Products**

Burning or excessive heating may produce carbon monoxide and other harmful gases or vapors including oxides and/or other compounds of sulfur.

The inhalation of components of exhaust from combusted fuel can be fatal in high concentrations in an enclosed area. Exposure to exhaust from this fuel should be minimized.
### 11. TOXICOLOGICAL INFORMATION

**Toxicological Information**
The information found in this section is written for medical, toxicology, occupational health and safety professionals. This section provides technical information on the toxicity testing of this or similar materials or its components. If clarification of the technical content is needed, consult a professional in the areas of expertise listed above.

**Inhalation**
Toxicity studies on this material resulted in LC50 values greater than 5.0 mg/l indicating a low potency. There were signs of respiratory tract irritation and central nervous system depression.

**Eye Contact**
Minimal to no irritation in animal studies.

**Skin Contact**
Animal studies resulted in moderate skin irritation following short term or prolonged/repeated exposure. The acute dermal toxicity tests indicate LD50 values greater than 2.0 g/kg indicating a low potency. Exposure to sunlight does not increase skin irritation. This material appears to be non-sensitizing.

**Ingestion**
The acute oral toxicity tests produced LD50 values greater than 5.0 g/kg indicating a low potency. There were signs of gastrointestinal tract irritation and central nervous system depression.

**Prolonged/Repeated Exposures**
Twenty-eight day dermal toxicity studies resulted in moderate skin irritation. In some studies changes in liver, kidney, testes and whole body weights were noted, but no significant systemic tissue changes characteristic of disease. Ninety-day dermal toxicity studies with similar material resulted in moderate skin irritation and not other significant observations or systemic tissue changes characteristic of disease. Twenty-eight day inhalation toxicity study with similar materials resulted in kidney damage in male rats.

A two-year inhalation study with a generic unleaded gasoline formulated by the American Petroleum Institute caused kidney damage and kidney tumors in male rats and liver tumors in female mice. These effects are considered specific to these laboratory animals and not applicable to humans.

Exposure to components of gasoline such as benzene, toluene, xylene, ethylbenzene, trimethylbenzene, and N-hexane has also been shown to affect reproductive capacity and/or fetal development in laboratory animals.

Studies with laboratory animals (dogs) indicate that exposure to extremely high concentrations of gasoline (greater than 50,000 ppm) may cause irregular heartbeats and sudden death. Exposures of laboratory animals to some components of this material at very high concentrations, well above the recommended exposure limits in Section 2, have resulted in cardiac sensitization with irregular heartbeats.

Exposure to n-hexane at concentrations considerably higher than the current permissible exposure limit has reportedly been associated with peripheral neuropathy. Commercial hexane exposures up to 9000 ppm were not carcinogenic in laboratory animals.

In animal studies and in workers with chronic benzene poisoning, alterations in structure of chromosomes in bone marrow and white blood cells have been observed.

**Additional Ethanol Toxicity Information**
Exposures to ethanol in gasoline are considerably lower than levels which have caused adverse health effects. Adverse health effects are not expected to occur at exposure levels typically encountered in the use of ethanol as a gasoline additive.

Prolonged and repeated exposure to ethanol vapor above 1000 ppm may cause headache, lack of coordination, sleepiness, fatigue, and difficulty concentrating. Chronic ingestion of ethanol in the form of alcoholic beverages has resulted in liver, stomach, heart and nervous system damage as well as cancers of the mouth, pharynx, larynx, esophagus, and liver in humans. Repeated ingestion of ethanol in the form of alcoholic beverages by pregnant women has caused miscarriage, premature birth and low birth weight, and birth defects (fetal alcohol syndrome).

**Additional MTBE Toxicity Information**
MTBE at very high exposure levels (8000 ppm) did induce developmental toxicity in mice, but only at levels where there was also maternal toxicity. In rabbits exposed to the same MTBE levels, there were no indicators of any effects on the offspring, even in the presence of maternal toxicity. The abnormal findings in the mice (cleft palate, etc.) are well-recognized effects of stress in the pregnant mouse and have no correlation with development hazards in humans.
Chronic toxicity studies have been completed for MTBE. In these studies, B6C3Fl mice and F344 rats were exposed to 400, 3000, or 8000 ppm MTBE vapors, 6 hrs/day, 5 days/week for life. Few adverse effects were noted for either rats or mice.

Male and female mice exposed to 8000 ppm MTBE vapors developed a slightly higher incidence of benign liver tumors during their lifetime. No other adverse effects or increases in tumor incidences were found.

Male and female rats exposed to high concentrations of MTBE vapors developed an increasing incidence of chronic progressive kidney damage, an effect typically noted in aging rats. These effects were most severe in 3000 and 8000 ppm exposure groups and were accompanied by an increased incidence of kidney tumors (males only). These findings are consistent with kidney damage associated with accumulation of protein in cells, an effect which may be unique to the male rat. Benign testicular tumors were numerically increased in high dose MTBE male rats, but this is an age-related lesion which typically occurs in a very high proportion of control untreated rats.

MTBE does not appear to be a mutagen.

All of these effects either occur in tissues prone to the development of tumors or may occur by a mechanism not considered relevant to humans. The significance of these findings for human health hazards estimation is unclear. Furthermore, IARC has determined that MTBE is not classifiable as to its carcinogenicity to humans (Group 3).

12. ECOLOGICAL INFORMATION

Not Available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Consult an environmental professional to determine if state or federal regulations would classify this material as a hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Comply with all federal, state and local laws pertaining to waste management.

14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>UN Proper Shipping Name</th>
<th>Gasoline</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>UN Number</td>
<td>UN1203</td>
</tr>
<tr>
<td>UN Packing Group</td>
<td>PGII</td>
</tr>
</tbody>
</table>
15. REGULATORY INFORMATION

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III

Section 311/312 Hazard Categories:
Acute Health Hazard
Delayed (chronic) health hazard
Fire hazard

Section 313:
This product contains the following chemicals subject to the reporting requirements established by SARA Title III:

- BENZENE
- CYCLOHEXANE
- ETHYLBENZENE
- METHYL TERT-BUTYL ETHER
- TOLUENE
- XYLENE

TOXIC SUBSTANCES CONTROL ACT (TSCA)
All components of this product are listed on the TSCA Inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)
This material is covered by CERCLA’s PETROLEUM EXEMPTION.
(Refer to 40 CFR 307.14)

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - PROPOSITION 65

PROP 65 WARNING LABEL:
Chemicals known to the State to cause cancer, birth defects, or other reproductive harm are found in gasoline, crude oil, and many other petroleum products and their vapors, or result from their use. Read and follow label directions and use care when handling or using all petroleum products.

WARNING:
This product contains the following chemical(s) listed by the State of California as known to cause cancer or birth defects or other reproductive harm.

- BENZENE (C) (R)
- TOLUENE (R)

Other Prop 65 chemicals will result under certain conditions from the use of this material. For example, burning fuels produces combustion products including carbon monoxide, a Prop 65 reproductive toxin.

(C) = Carcinogen  
(R) = Birth Defects or other Reproductive Harm

16. OTHER INFORMATION

General Comments
Because of volatility characteristics, gasoline vapors may have concentrations of components different from those of liquid gasoline. The major components of gasoline vapors from liquid gasoline are butane, isobutane, pentane and isopentane.

The information and conclusions herein reflect normal operating conditions and may be from sources other than direct test data on the mixture itself.

Abbreviations:
- EQ = Equal
- LT = Less Than
- GT = Greater Than
- AP = Approximately
- UK = Unknown
- TR = Trace
- N/P = No Applicable Information Found
- N/AP = Not Applicable
- N/DA = No Data Available

Prepared by: Product Stewardship

Disclaimer of Liability
The information in this MSDS was obtained from sources which we believe are reliable. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.
SAFETY DATA SHEET
GENGARD* GN8004

1. Identification
Product identifier: GENGARD GN8004
Other means of identification: None.
Recommended use: Corrosion inhibitor
Recommended restrictions: None known

Company/undertaking identification
GE Betz, Inc
4636 Somerton Road
Traverse, PA 19053
T 215 355 3300, F 215 953 5524

Emergency telephone
1800 877 1940

2. Hazard(s) Identification
Physical hazards: Not classified.
Health hazards: Not classified.
OSHA defined hazards: Not classified.

Label elements
Hazard symbol: None.
Signal word: None.
Hazard statement: The mixture does not meet the criteria for classification.

Precautionary statement
Prevention: Observe good industrial hygiene practices.
Response: Wash hands after handling.
Storage: Store away from incompatible materials.
Disposal: Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified
INNOCI
Supplemental information: None.

3. Composition/Information on Ingredients
Mixtures
The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

Composition comments: The product does not contain hazardous ingredients in reportable concentrations.

4. First-aid measures
Inhalation: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Skin contact: Rinse skin with water/shower. Get medical attention if irritation develops and persists.
Eye contact
Rinse with water. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.

Most important symptoms/effects, acute and delayed
Direct contact with eyes may cause temporary irritation.

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

General information
Ensure that medical personnel are aware of the materials involved, and take precautions to protect themselves.

5. Fire-fighting measures
Suitable extinguishing media
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use water jet as an extinguisher; this will spread the fire.

Specific hazards arising from the chemical
During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions
Use standard firefighting procedures and consider the hazards of other involved materials.

Specific methods
Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
No unusual fire or explosion hazards noted.

6. Accidental release measures
Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up
Large Spills: Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions
Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage
Precautions for safe handling
Handle in accordance with good industrial hygiene and safety procedures. Avoid prolonged exposure.

Conditions for safe storage, including any incompatibilities
Non-inflammable. Keep container tightly closed. Store in cool, well ventilated area. Store away from oxidizers. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store in original tightly closed container.

8. Exposure controls/personal protection
Occupational exposure limits
No exposure limit noted for ingredients.

Biological limit values
No biological exposure limits noted for the ingredients.

Appropriate engineering controls
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.

Individual protection measures, such as personal protective equipment
Eye/face protection
Splash proof chemical goggles.

Skin protection
Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

Hand protection
Wear suitable protective clothing.

Other

Thermal hazards: Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations: 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.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Amber</td>
</tr>
<tr>
<td>Color</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH (concentrated product)</td>
<td>5</td>
</tr>
<tr>
<td>pH in aqueous solution</td>
<td>5.9 (15% SOL)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>25 °F (4 °C)</td>
</tr>
<tr>
<td>Initial boiling point and boiling</td>
<td>220 °F (109 °C)</td>
</tr>
<tr>
<td>range</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1 (Ether = 1)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive</td>
<td>Not available</td>
</tr>
<tr>
<td>limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>Not available</td>
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<tr>
<td>Explosive limit - upper (%)</td>
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</tr>
<tr>
<td>Vapor pressure</td>
<td>18 mm Hg</td>
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<tr>
<td>Vapor pressure temp.</td>
<td>70 °F (21 °C)</td>
</tr>
<tr>
<td>Vapor density</td>
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<tr>
<td>Relative density</td>
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</tr>
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<tr>
<td>Solubilities</td>
<td>100%</td>
</tr>
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<td>Solubility (water)</td>
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</tr>
<tr>
<td>Partition coefficient</td>
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</tr>
<tr>
<td>(n-octane/water)</td>
<td></td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
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<tr>
<td>Decomposition temperature</td>
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<tr>
<td>Viscosity</td>
<td>48 cP</td>
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<td>Viscosity temperature</td>
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<tr>
<td>Other information</td>
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<tr>
<td>Percent volatility</td>
<td>0 (Calculated)</td>
</tr>
<tr>
<td>Pour point</td>
<td>30 °F (+1 °C)</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.11</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactivity: The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability: Material is stable under normal conditions.

Possibility of hazardous reactions: Contact with water reactive compounds may cause fire or explosion. Hazardous polymerization does not occur.

Conditions to avoid: Avoid contact with strong oxidizers. Protect from freezing. Contact with incompatible materials.

Incompatible materials: Material name: GENIARD® GIBRID

Version number: 5.0
Hazardous decomposition products

Oxides of carbon evolved in fire

11. Toxicological information

Information on likely routes of exposure

**Inhalation**
May cause irritation to respiratory organs.

**Skin contact**
Prolonged or repeated contact may cause transient irritation.

**Eye contact**
Direct contact with eyes may cause temporary irritation.

**Ingestion**
May cause gastrointestinal irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENGARD GN8004 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 5000 mg/kg, Calculated according to GHS additivity formula</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg, Calculated according to GHS additivity formula</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation
Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation
Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

**Respiratory sensitization**
Not a respiratory sensitizer

**Skin sensitization**
This product is not expected to cause skin sensitization.

Germ cell mutagenicity
No data available to indicate product or any components present or greater than 0.1% are mutagenic of genotoxic.

Carcinogenicity
This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity
Not available.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens
Not available.

Reproductive toxicity
This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure
Not classified.

Specific target organ toxicity - repeated exposure
Not classified.

Aspiration hazard
Based on available data, the classification criteria are not met. May be harmful if swallowed and enters the airways.

Chronic effects
Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity
The product is 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.
Product   | Specific   | Test Results
---|---|---
GENSARO GANSHO (CAS Mixture)  | LC50 Ctenopagis  | 1707.6 mg/L, Static Acute Bioassay, 48 hour
 | LC50 Fathead Minnow | 2367 mg/L, Static Acute Bioassay, 96 hour
 | LC50 Daphnia magna | 1000 mg/L, Chronic Bioassay, 7 day
 | LC50 Fathead Minnow | 2000 mg/L, Chronic Bioassay, 7 day
 | LC50 Daphnia magna | 1250 mg/L, Static Acute Bioassay, 48 hour
 | LC50 Fathead Minnow | 900 mg/L, Chronic Bioassay, 7 day
 | LC50 Daphnia magna | 1250 mg/L, Static Acute Bioassay, 36 hour
 | LC50 Fathead Minnow | 1000 mg/L, Chronic Bioassay, 7 day

Aquatic:  | LC50 Daphnia magna | 3577 mg/L, Static Acute Bioassay, 48 hour
 | NOEL Daphnia magna | 2500 mg/L, Static Acute Bioassay, 48 hour
 | LC50 Rainbow Trout | 1894 mg/L, Static Acute Bioassay, 96 hour
 | NOEL Rainbow Trout | 1250 mg/L, Static Acute Bioassay, 7 day

* Estimates for product may be based on additional component data not shown.

11. Bioaccumulative potential
Mobility in soil
Other adverse effects
Environmental fate
Persistence and degradability

- COD (mgO2/g)
- BOD (mgO2/g)
- BOD 28 (mgO2/g)
- Closed Bottle Test (%)
- Degradation in 28 days
- TPH (mg/g)

12. Disposal considerations
Disposal instructions
Local disposal regulations
Hazardous waste code
Waste from residues / unused products
Contaminated packaging

13. Transport information
DOT
- Not regulated as dangerous goods.
- Some containers may be exempt from Dangerous Goods/Hazardous Transport Regulations, please check BOL for exact container classification.

IATA
- Not regulated as dangerous goods.

IMDG
- Not regulated as dangerous goods.
15. Regulatory information

**US federal regulations**

All components are on the U.S. EPA TSCA Inventory List. This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

<table>
<thead>
<tr>
<th>Category / List</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</td>
<td>Not regulated</td>
</tr>
<tr>
<td>CERCLA Hazardous Substance List (40 CFR 302.4)</td>
<td>Not listed</td>
</tr>
<tr>
<td>SARA 304 Emergency release notification</td>
<td>Not regulated</td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th>Hazard categories</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Delayed Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Pressure Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactivity Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

| SARA 302 Extremely hazardous substance | Not listed |
| SARA 311/312 Hazardous chemical | No |
| SARA 313 TRI reporting | Not regulated |

**Other federal regulations**

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Status</th>
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<tbody>
<tr>
<td>Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List</td>
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<tr>
<td>Clean Air Act (CAA) Section 112(b) Accidental Release Prevention (40 CFR 68.130)</td>
<td>Not regulated</td>
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<tr>
<td>Safe Drinking Water Act (SDWA)</td>
<td>Not regulated</td>
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**Inventory status**

<table>
<thead>
<tr>
<th>Country or region</th>
<th>Inventory name</th>
<th>On Inventory (yes/no)</th>
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</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
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<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
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</tbody>
</table>

* "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country/region.
* "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country/region.

**US state regulations**

<table>
<thead>
<tr>
<th>State</th>
<th>Regulation</th>
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<tbody>
<tr>
<td>US</td>
<td>Massachussets RTK - Substance List</td>
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<tr>
<td>US</td>
<td>Pennsylvania RTK - Hazardous Substances</td>
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<tr>
<td>US</td>
<td>Rhode Island RTK</td>
<td>Not regulated</td>
</tr>
<tr>
<td>US</td>
<td>California Controlled Substances: CA Department of Justice (California Health and Safety Code Section 11160)</td>
<td>Not listed</td>
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<tr>
<td>US</td>
<td>New Jersey Worker and Community Right-to-Know Act</td>
<td>Not listed</td>
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<tr>
<td>US</td>
<td>Pennsylvania Worker and Community Right-to-Know Law</td>
<td>Not listed</td>
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<tr>
<td>US</td>
<td>California Proposition 65</td>
<td>Not listed</td>
</tr>
<tr>
<td>US</td>
<td>California Proposition 65 - CRT: Listed state/Carcinogenic substance</td>
<td>No ingredient listed</td>
</tr>
</tbody>
</table>

Material name: GENXID XN6004
Version number: 3.0
16. Other information, including date of preparation or last revision

<table>
<thead>
<tr>
<th>Issue date</th>
<th>Oct-27-2014</th>
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<tbody>
<tr>
<td>Revision date</td>
<td>Jan-14-2016</td>
</tr>
<tr>
<td>Version</td>
<td>3.0</td>
</tr>
</tbody>
</table>

List of abbreviations:
- CAS: Chemical Abstract Service Registration Number
- TWA: Time Weighted Average
- STEL: Short Term Exposure Limit
- LCLD: Lethal Concentration, 50%
- LC50: Lethal Concentration, 50%
- NOEL: No Observed Effect Level
- COD: Chemical Oxygen Demand
- BOD: Biochemical Oxygen Demand
- TCO: Total Organic Carbon
- IATA: International Air Transport Association
- IMDG: International Maritime Dangerous Goods Code
- ACGIH: American Conference of Governmental Industrial Hygienists
- NFPA: National Fire Protection Association
- ISN: Indicates a Trade Secret Registry Number is used in place of the CAS number

References:
- No data available

Disclaimer:
The information in the sheet was written based on the best knowledge and experience currently available.

Revision Information:
- Hazardous Identification/Prevention
- Hazards Identification Supplemental Information
- Composition/Information on ingredients Disclosure Overrides
- Composition/Information on ingredients: Composition comments
- Handling and storage: Precautions for safe handling
- Exposure controls/personal protection: Eye/face protection
- Physical & Chemical Properties: Multiple Properties
- Physical and chemical properties: Explosive properties
- Physical and chemical properties: Oxidizing properties
- Toxicological Information: Further information
- Other information, including date of preparation or last revision: Prepared by

Prepared by:
- This SDS has been prepared by GE Water & Process Technologies Regulatory Department (I-215-355-3300).
- Trademark of General Electric Company. May be registered in one or more countries.
Material Safety Data Sheet
Glycerin MSDS

Section 1: Chemical Product and Company Identification

Product Name: Glycerin
Catalog Codes: SLG1171, SLG1894, SLG1111, SLG1615
CAS#: 56-81-5
RTECS: MA8050000
TSCA: TSCA 8(b) inventory: Glycerin
CI#: Not available.
Synonym: 1,2,3-Propanetriol; Glycerol
Chemical Name: Glycerin
Chemical Formula: C3H5(OH)3

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: 1-800-901-7247
International Sales: 1-281-441-4400
Order Online: ScienceLab.com
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerin</td>
<td>56-81-5</td>
<td>100</td>
</tr>
</tbody>
</table>

Toxicological Data on Ingredients: Glycerin: ORAL (LD50): Acute: 12600 mg/kg [Rat]. 4090 mg/kg [Mouse]. DERMAL (LD50): Acute: 10000 mg/kg [Rabbit]. MIST(LC50): Acute: &gt;570 mg/m 1 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention if irritation occurs.
Skin Contact:  
Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation:  
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Not available.

Ingestion:  
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature:  

Flash Points:  

Flammable Limits: LOWER: 0.9%

Products of Combustion: These products are carbon oxides (CO, CO2), irritating and toxic fumes.

Fire Hazards in Presence of Various Substances:  
Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:  

Fire Fighting Media and Instructions:  
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:  
Glycerin is incompatible with strong oxidizers such as chromium trioxide, potassium chlorate, or potassium permanganate and may explode on contact with these compounds. Explosive glyceryl nitrate is formed from a mixture of glycerin and nitric and sulfuric acids. Perchloric acid, lead oxide + glycerin form perchloric esters which may be explosive. Glycerin and chlorine may explode if heated and confined.

Section 6: Accidental Release Measures

Small Spill:  
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Do not get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Hygroscopic.

### Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 10 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation Total. TWA: 15 (mg/m3) from OSHA (PEL) [United States] Inhalation Total. TWA: 10 STEL: 20 (mg/m3) [Canada] TWA: 5 (mg/m3) from OSHA (PEL) [United States] Inhalation Respirable. Consult local authorities for acceptable exposure limits.

### Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Viscous (Syrupy) liquid.)

**Odor:** Mild

**Taste:** Sweet.

**Molecular Weight:** 92.09 g/mole

**Color:** Clear Colorless.

**pH (1% soln/water):** Not available.

**Boiling Point:** 290°C (554°F)

**Melting Point:** 19°C (66.2°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.2636 (Water = 1)

**Vapor Pressure:** 0 kPa (@ 20°C)

**Vapor Density:** 3.17 (Air = 1)
Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -1.8

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, acetone.

Solubility:

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Avoid contact with incompatible materials, excess heat and ignition, sources, moisture.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Glycerin is incompatible with strong oxidizers such as chromium trioxide, potassium chlorate, or potassium permanganate. Glycerin may react violently with acetic anhydride, aniline and nitrobenzene, chromic oxide, lead oxide and fluorine, phosphorous triiodide, ethylene oxide and heat, silver perchlorate, sodium peroxide, sodium hydride.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 4090 mg/kg [Mouse]. Acute dermal toxicity (LD50): 10000 mg/kg [Rabbit]. Acute toxicity of the mist (LC50): >570 mg/m3 1 hours [Rat].

Chronic Effects on Humans: May cause damage to the following organs: kidneys.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
TDL (rat) - Route: Oral; Dose: 100 mg/kg 1 day prior to mating. TDL (human) - Route: Oral; Dose: 1428 mg/kg

Special Remarks on Chronic Effects on Humans:
Glycerin is transferred across the placenta in small amounts. May cause adverse reproductive effects based on animal data (Paternal Effects (Rat): Spermatogenesis (including genetic material, sperm morphology, motility, and count), Testes, epididymis, sperm duct). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Low hazard for normal industrial handling or normal workplace conditions. Skin: May cause skin irritation. May be absorbed through skin Eyes: May cause eye irritation with stinging, redness, burning sensation, and tearing, but no eye injury. Ingestion: Low hazard. Low toxicity except with very large doses. When large doses are ingested, it can cause gastrointestinal tract irritation with thirst (dehydration), nausea or vomiting diarrhea. It may also affect behavior/central nervous system/nervous system (central nervous system depression, general anesthetic, headache, dizziness, confusion, insomnia, toxic psychosis, muscle weakness, paralysis/convulsions), urinary system/kidneys (renal failure,
hemoglobinuria), cardiovascular system (cardiac arrhythmias), liver. It may also cause elevated blood sugar. Inhalation: Due to low vapor pressure, inhalation of the vapors at room temperature is unlikely. Inhalation of mist may cause respiratory tract irritation. Chronic Potential Health Effects: Ingestion: Prolonged or repeated ingestion may affect the blood (hemolysis, changes in white blood cell count), endocrine system (changes in adrenal weight), respiratory system, and may cause kidney injury.

**Section 12: Ecological Information**

**Ecotoxicity:** Ecotoxicity in water (LC50): 58.5 ppm 96 hours [Trout].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations**

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information**

**Federal and State Regulations:**
Illinois toxic substances disclosure to employee act: Glycerin
Rhode Island RTK hazardous substances: Glycerin
Pennsylvania RTK: Glycerin
Minnesota: Glycerin
Massachusetts RTK: Glycerin
Tennessee - Hazardous Right to Know: Glycerin

**Other Regulations:**

**Other Classifications:**
WHMIS (Canada): Not controlled under WHMIS (Canada).

**DSCL (EEC):**
Not available S24/25- Avoid contact with skin and eyes.

**HMIS (U.S.A.):**
- Health Hazard: 1
- Fire Hazard: 1
- Reactivity: 0
- Personal Protection: g
National Fire Protection Association (U.S.A.):

Health: 1
Flammability: 1
Reactivity: 0
Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:38 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.
SAFETY DATA SHEET
HIGH CALCIUM HYDRATED LIME

Section 1. Identification

<table>
<thead>
<tr>
<th>GHS product identifier</th>
<th>HIGH CALCIUM HYDRATED LIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>Not available.</td>
</tr>
<tr>
<td>Product type</td>
<td>Solid.</td>
</tr>
</tbody>
</table>

Identified uses
Neutralization, floculation, stabilization, absorption.

Supplier/Manufacturer
GRAYMONT
#200-10991 Shellbridge Way
Richmond, BC V6X 3C6
Canada
Phone: 1 604 207-4292
Toll free: 1 866 207-4292
Fax: 1 604 207-9014
Web Site: http://www.graymont.com/

Emergency telephone number (with hours of operation)
CANUTEC (613-996-6666)
CHEMTREC, US (800-424-9300)
INTERNATIONAL: (703-527-3887)

Section 2. Hazards identification

OSHA/HCS status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
CARCINOGENICITY (inhalation) - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements
Hazard pictograms

Signal word
Danger

Hazard statements
H318 - Causes serious eye damage.
H315 - Causes skin irritation.
H350 - May cause cancer if inhaled.
H335 - May cause respiratory irritation.
H372 - Causes damage to organs through prolonged or repeated exposure.

Precautionary statements
Section 2. Hazards identification

**Prevention**
- P201 - Obtain special instructions before use.
- P202 - Do not handle until all safety precautions have been read and understood.
- P281 - Use personal protective equipment as required.
- P280 - Wear protective gloves, wear eye or face protection.
- P271 - Use only outdoors or in a well-ventilated area.
- P260 - Do not breathe dust.
- P270 - Do not eat, drink or smoke when using this product.
- P264 - Wash hands thoroughly after handling.

**Response**
- P314 - Get medical attention if you feel unwell.
- P308 + P313 - IF exposed or concerned: Get medical attention.
- P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
- P302 + P352 + P362 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse.
- P332 + P313 - IF SKIN IRRITATION occurs: Get medical attention.
- P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

**Storage**
- P401 - Store to minimize dust generation.

**Disposal**
- P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Hazards not otherwise classified (HNOC)**
- Physical hazards not otherwise classified (PHNOC): None known.
- Health hazards not otherwise classified (HHNOC): None known.

Section 3. Composition/information on ingredients

**Substance/mixture**: Mixture


**CAS number/other identifiers**
- **CAS number**: Not applicable.
- **Product code**: Not available.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
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</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>90 - 100</td>
<td>1305-62-0</td>
</tr>
<tr>
<td>Crystalline silica, quartz</td>
<td>0.0001 - 1</td>
<td>14608-60-7</td>
</tr>
</tbody>
</table>

Crystalline silica has been found in some products at or above detection level 0.1%. Concentration is dependent upon limestone source.

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

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

Occupational exposure limits, if available, are listed in Section 8.
Section 4. First aid measures

**Description of necessary first aid measures**

### Eye contact
- Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Get medical attention immediately. Call a poison center or physician.

### Inhalation
- Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Skin contact
- Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

### Ingestion
- Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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

#### Potential acute health effects
- **Eye contact**: Causes serious eye damage.
- **Inhalation**: May cause respiratory irritation.
- **Skin contact**: Causes skin irritation.
- **Ingestion**: No known significant effects or critical hazards.

#### Over-exposure signs/symptoms
- **Eye contact**: Adverse symptoms may include the following:
  - pain
  - watering
  - redness
- **Inhalation**: Adverse symptoms may include the following:
  - respiratory tract irritation
  - coughing
  - burning sensation
- **Skin contact**: Adverse symptoms may include the following:
  - pain or irritation
  - redness
  - blistering may occur
- **Ingestion**: Adverse symptoms may include the following:
  - burning sensation
  - abdominal cramps and pain
  - vomiting
**Section 4. First aid measures**

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

**Notes to physician**
Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments**
No specific treatment.

**Protection of first-aiders**
No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

*See toxicological information (Section 11)*

**Section 5. Fire-fighting measures**

**Extinguishing media**

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

**Specific hazards arising from the chemical**

- **Hazardous thermal decomposition products**: None.
- **Specific fire or explosion hazard**: No specific fire or explosion hazard.

**Special protective actions for fire-fighters**
No special measures are required.

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

**Section 6. Accidental release measures**

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

- **For non-emergency personnel**: No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- **For emergency responders**: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions**: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods and materials for containment and cleaning up**

- **Spill**: Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
Section 7. Handling and storage

Precautions for safe handling:
Protective measures: Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.

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

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

Section 8. Exposure controls/personal protection

Control parameters
United States
Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>OSHA PEL (United States, 2/2013). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction</td>
</tr>
<tr>
<td></td>
<td>TWA: 15 mg/m³ 8 hours. Form: Total dust</td>
</tr>
<tr>
<td></td>
<td>ACGIH TLV (United States, 4/2014). TWA: 5 mg/m³ 8 hours.</td>
</tr>
<tr>
<td>Crystalline silica, quartz</td>
<td>NIOSH REL (United States, 10/2013). TWA: 5 mg/m³ 10 hours.</td>
</tr>
<tr>
<td></td>
<td>MSHA PEL TWA 8/40 hours: 5 mg/m³</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL 23 (United States, 2/2013). TWA: 10 mg/m³ 8 hours. Form: Respirable</td>
</tr>
<tr>
<td></td>
<td>TWA: 250 mg/m³ 8 hours. Form: Respirable</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 10/2013). TWA: 0.05 mg/m³ 10 hours. Form: Respirable dust</td>
</tr>
<tr>
<td></td>
<td>ACGIH TLV (United States, 4/2014). TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction</td>
</tr>
</tbody>
</table>

Canada

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TWA (8 hours)</th>
<th>STEL (15 mins)</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium dihydroxide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB 4/2009</td>
<td>5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BC 7/2013</td>
<td>5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ON 1/2013</td>
<td>5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>QC 1/2014</td>
<td>5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Calcium hydroxide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US ACGIH 4/2014</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>AB 4/2009</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BC 7/2013</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ON 1/2013</td>
<td>0.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>QC 1/2014</td>
<td>0.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Crystalline silica, quartz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US ACGIH 4/2014</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>AB 4/2009</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BC 7/2013</td>
<td>0.025</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ON 1/2013</td>
<td>0.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>QC 1/2014</td>
<td>0.1</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Section 8. Exposure controls/personal protection

[3] Skin sensitization
Form: [a] Respirable fraction [b] Respirable particulate. [c] Respirable [d] Respirable dust

Appropriate engineering controls: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Engineering controls may be required to control the primary or secondary risks associated with this product.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

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

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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

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

Respiratory protection: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Wear an appropriate NIOSH approved respirator if concentration levels exceed the safe exposure limits.

Section 9. Physical and chemical properties

Appearance

Physical state: Solid. [Fine powder.]
Color: White.
Odor: Sweet, soil like odor.
Odor threshold: Not available.
pH: 12.45 [Sat. soln.] at 25°C
Melting point: Not available.
Section 9. Physical and chemical properties

- Boiling point: Not available.
- Flash point: Not applicable.
- Evaporation rate: Not available.
- Flammability (solid, gas): Not applicable.
- Lower and upper explosive (flammable) limits: Not applicable.
- Vapor pressure: Not available.
- Vapor density: Not available.
- Relative density: 2.3 to 2.4
- Solubility: Not available.
- Solubility in water: 0.165 g/100 g at 20°C
- Partition coefficient: n-octanol/water: Not available.
- Auto-ignition temperature: Not applicable.
- Decomposition temperature: 540°C (1004°F)
- Viscosity: Not available.
- Volatility: Not available.
- VOC (w/w): 0 % (w/w)

Section 10. Stability and reactivity

- Reactivity: No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability: The product is stable.
- Possibility of hazardous reactions: None.
- Conditions to avoid: Do not allow quicklime to come into contact with incompatible materials. e.g. Water, acids, reactive fluoridated compounds, reactive brominated compounds, reactive powered metals, organic acid anhydrides, nitro-organic compounds, reactive phosphorous compounds, interhalogenated compounds.
- Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials and acids.
- Hazardous decomposition products: None.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>7340 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>10 mg</td>
<td>-</td>
</tr>
</tbody>
</table>
## Section 11. Toxicological information

### Sensitization
There is no data available.

### Carcinogenicity

#### Classification

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>EPA</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica, quartz</td>
<td>-</td>
<td>1</td>
<td>Known to be a human carcinogen.</td>
<td>A2</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

#### Specific target organ toxicity (single exposure)

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

#### Specific target organ toxicity (repeated exposure)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica, quartz</td>
<td>Category 1</td>
<td>Inhalation</td>
<td>kidneys, respiratory tract and testes</td>
</tr>
</tbody>
</table>

### Aspiration hazard
There is no data available.

### Information on the likely routes of exposure:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal contact</td>
<td>Eye contact</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Ingestion</td>
</tr>
</tbody>
</table>

### Potential acute health effects

- **Eye contact**: Causes serious eye damage.
- **Inhalation**: May cause respiratory irritation.
- **Skin contact**: Causes skin irritation.
- **Ingestion**: No known significant effects or critical hazards.

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

- **Eye contact**: Adverse symptoms may include the following:
  - pain
  - watering
  - redness

- **Inhalation**: Adverse symptoms may include the following:
  - respiratory tract irritation
  - coughing
  - burning sensation

- **Skin contact**: Adverse symptoms may include the following:
  - pain or irritation
  - redness
  - blistering may occur

- **Ingestion**: Adverse symptoms may include the following:
  - burning sensation
  - abdominal cramps and pain
  - vomiting

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

#### Short term exposure
Section 11. Toxicological information

Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.
Long term exposure:
Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.

Potential chronic health effects:
General: Causes damage to organs through prolonged or repeated exposure.
Carcinogenicity: May cause cancer if inhaled. Risk of cancer depends on duration and level of exposure.
Mutagenicity: No known significant effects or critical hazards.
Teratogenicity: No known significant effects or critical hazards.
Developmental effects: No known significant effects or critical hazards.
Fertility effects: No known significant effects or critical hazards.

Numerical measures of toxicity
Acute toxicity estimates
There is no data available.

Section 12. Ecological information

Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>Acute LC50 33884.4 µg/L Fresh water</td>
<td>Fish - Clarias gariepinus - Fingerling</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

Persistence and degradability
There is no data available.

Bioaccumulative potential
There is no data available.

Mobility in soil
Soil/water partition coefficient (Koc): Not available.

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid disposal of
Section 13. Disposal considerations
spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

<table>
<thead>
<tr>
<th></th>
<th>DOT</th>
<th>TDG</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Additional information</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

AERG : Not applicable.

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): Calcium Hydroxide is subject to inventory update reporting (IUR).
RCRA classification: Calcium Hydroxide is not listed or classified.
CWA-311: Calcium Hydroxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400).
CERCLA: Calcium Hydrpoxide is not listed.
FDA: Calcium Hydroxide has been determined as Generally Recognized As Safe (GRAS) by FDA. See 21CFR184.1205. (CFR Title 21 Part 184 - Direct food substances affirmed as generally recognized as safe).

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed
Clean Air Act Section 602 Class I Substances : Not listed
Clean Air Act Section 602 Class II Substances : Not listed
Section 15. Regulatory information

DEA List I Chemicals (Precursor Chemicals) : Not listed
DEA List I Chemicals (Precursor Chemicals) : Not listed

SARA 302/304
Composition/information on ingredients
No products were found.
SARA 304 RQ : Not applicable.
SARA 311/312
Classification : Immediate (acute) health hazard Delayed (chronic) health hazard

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>90 - 100</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
<tr>
<td>Crystalline silica, quartz</td>
<td>0.0001 - 1</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

SARA 313

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form R - Reporting requirements</td>
<td>Not listed</td>
<td>-</td>
</tr>
<tr>
<td>Supplier notification</td>
<td>Not listed</td>
<td>-</td>
</tr>
</tbody>
</table>

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

State regulations
Massachusetts : The following components are listed: Calcium Hydroxide; Crystalline silica, quartz
New York : None of the components are listed.
New Jersey : The following components are listed: Calcium Hydroxide; Crystalline silica, quartz
Pennsylvania : The following components are listed: Calcium Hydroxide; Crystalline silica, quartz

California Prop. 65
WARNING: This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica, quartz</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

Canada

Canadian lists
Canadian NPRI : None of the components are listed.
CEPA Toxic substances : None of the components are listed.
Canada inventory : All components are listed or exempted.

International lists
National inventory
Section 15. Regulatory information

Australia: All components are listed or exempted.
China: All components are listed or exempted.
Europe: All components are listed or exempted.
Japan: All components are listed or exempted.
Malaysia: Not determined.
New Zealand: All components are listed or exempted.
Philippines: All components are listed or exempted.
Republic of Korea: All components are listed or exempted.
Taiwan: Not determined.

Section 16. Other information

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

Health: 3 * Flammability: 0 Physical hazards: 1

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

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

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

Health: 3 Flammability: 0 Instability: 1

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response. Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

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

History

Date of issue mm/dd/yyyy: 04/15/2015
Version: 1
Prepared by: KMK Regulatory Services Inc.

Key to abbreviations

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

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
# SAFETY DATA SHEET

CITGO AW Hydraulic Oil 32

## Section 1. Identification

<table>
<thead>
<tr>
<th>GHS product identifier</th>
<th>: CITGO AW Hydraulic Oil 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>: Hydraulic Fluid</td>
</tr>
<tr>
<td>Code</td>
<td>: 633491001</td>
</tr>
</tbody>
</table>

**Supplier's details**

<table>
<thead>
<tr>
<th>: CITGO Petroleum Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.O. Box 4689</td>
</tr>
<tr>
<td>Houston, TX 77210</td>
</tr>
<tr>
<td><a href="mailto:sdsven@citgo.com">sdsven@citgo.com</a></td>
</tr>
</tbody>
</table>

**Emergency telephone number**

| : Technical Contact: (800) 248-4684 |
| : Medical Emergency: (832) 486-4700 |
| : CHEMTREC Emergency: (800) 424-9300 |
| (United States Only)          |

## Section 2. Hazards identification

**OSHA/HCS status**

While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

**Classification of the substance or mixture**

| : Not classified. |

**GHS label elements**

<table>
<thead>
<tr>
<th>Signal word</th>
<th>: Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statements</td>
<td>: Injection under the skin can cause severe injury. Most damage occurs in the first few hours. Initial symptoms may be minimal.</td>
</tr>
</tbody>
</table>

**Precautionary statements**

**General**

Avoid contact with eyes, skin and clothing. MAY BE HARMFUL IF SWALLOWED. IF IN EYES: Rinse cautiously with water for several minutes. Do NOT induce vomiting. After handling, always wash hands thoroughly with soap and water. If you feel unwell, seek medical attention and show the label when possible. Keep out of reach of children.

**Prevention**

| : Not applicable. |

**Response**

| : Not applicable. |

**Storage**

| : Store in a dry place and/or in closed container. Store in accordance with all local, regional, national and international regulations. |

**Disposal**

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

**Hazard not otherwise classified**

| : Injection of petroleum hydrocarbons requires immediate medical attention |

## Section 3. Composition/information on ingredients

**Substance/mixture**

| : Mixture |

**Other means of identification**

| : Hydraulic Fluid |

**CAS number/other identifiers**

| CAS number | : Not applicable. |
Section 3. Composition/information on ingredients

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

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion: Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute

Potential acute health effects

Eye contact: No known significant effects or critical hazards.
Inhalation: No known significant effects or critical hazards.
Skin contact: Injection of pressurized hydrocarbons can cause severe permanent tissue damage. Initial symptoms may be minor.
Ingestion: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact: No specific data.
Inhalation: No specific data.
Skin contact: No specific data.
Ingestion: No specific data.

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

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments: Treat symptomatically and supportively.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Specific hazards arising from the chemical: In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

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

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

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

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill: Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill: Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

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

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

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

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.
Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits
None identified.

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

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

Individual protection measures

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

Eye/face protection
: Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

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

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

Other skin protection
: Avoid skin contact with liquid. Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Leather boots are not protective for liquid contact.

Respiratory protection
: Avoid inhalation of gases, vapors, mists or dusts. Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Physical state
: Liquid.
Color
: Light amber [Light]
Odor
: Mild petroleum odor [Slight]

pH
: Not applicable.

Boiling point/boiling range
: Not available.
Flash point
: Open cup: 214°C (417.2°F) [Cleveland.]

Lower and upper explosive (flammable) limits
: Not available.

Vapor pressure
: Not available.
Vapor density
: Not available.
Relative density
: Not available.

Density lbs/gal
: 7.14 lbs/gal

Gravity, °API
: 33.6
## Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity</td>
<td>Dynamic (room temperature): Not applicable. Kinematic (room temperature): Not applicable. Kinematic (40°C (104°F)): 0.32 cm²/s (32 cSt)</td>
</tr>
<tr>
<td>Viscosity SUS</td>
<td>155 SUS @ 100 F</td>
</tr>
</tbody>
</table>

## Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s).</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>The product is stable.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>No specific data.</td>
</tr>
<tr>
<td>Incompatible materials</td>
<td>No specific data.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
</tr>
</tbody>
</table>

## Section 11. Toxicological information

### Information on toxicological effects

**Acute toxicity**

**Conclusion/Summary**: Distillates (petroleum), hydrotreated heavy paraffinic: Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipid granuloma formation and lipid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current workplace exposure levels produced no significant toxicological effects.

**Irritation/Corrosion**

- **Skin**: No additional information.
- **Eyes**: No additional information.
- **Respiratory**: No additional information.

**Sensitization**

- **Skin**: No additional information.
- **Respiratory**: No additional information.

**Mutagenicity**

**Conclusion/Summary**: No additional information.

**Carcinogenicity**

**Conclusion/Summary**: No additional information.

**Reproductive toxicity**

**Conclusion/Summary**: No additional information.

**Teratogenicity**

**Conclusion/Summary**: No additional information.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.
Section 11. Toxicological information

Aspiration hazard
Not available.

Information on the likely routes of exposure
Not available.

Potential acute health effects
- **Eye contact**: No known significant effects or critical hazards.
- **Inhalation**: No known significant effects or critical hazards.
- **Skin contact**: Injection of pressurized hydrocarbons can cause severe permanent tissue damage. Initial symptoms may be minor.
- **Ingestion**: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics
- **Eye contact**: No specific data.
- **Inhalation**: No specific data.
- **Skin contact**: No specific data.
- **Ingestion**: No specific data.

Potential chronic health effects
- **General**: No known significant effects or critical hazards.
- **Carcinogenicity**: No known significant effects or critical hazards.
- **Mutagenicity**: No known significant effects or critical hazards.
- **Teratogenicity**: No known significant effects or critical hazards.
- **Developmental effects**: No known significant effects or critical hazards.
- **Fertility effects**: No known significant effects or critical hazards.

Section 12. Ecological information

**Toxicity**
- **Conclusion/Summary**: Not available.

**Persistence and degradability**
- **Conclusion/Summary**: Not available.

**Bioaccumulative potential**
Not available.

**Mobility in soil**
- **Soil/water partition coefficient (Koc)**: Not available.

**Other adverse effects**
- No known significant effects or critical hazards.
Section 13. Disposal considerations

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

Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT Classification</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Additional information</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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

Section 15. Regulatory information

U.S. Federal regulations: United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: Zinc and zinc compounds; Toluene; Phenol

Clean Water Act (CWA) 311: Toluene; Phenol

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA’s National Response Center at (800) 424-8802.

SARA 302/304

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>EHS</th>
<th>SARA 302 TPQ (lbs)</th>
<th>(gallons)</th>
<th>SARA 304 RQ (lbs)</th>
<th>(gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>&lt;0.001</td>
<td>Yes.</td>
<td>500 / 10000</td>
<td>-</td>
<td>1000</td>
<td>-</td>
</tr>
</tbody>
</table>
Section 15. Regulatory information

SARA 304 RQ : 106837606.8 lbs / 48504273.5 kg [14899387.7 gal / 56400318 L]
SARA 311/312 Classification : Not applicable.

Composition/information on ingredients

State regulations
Massachusetts : None of the components are listed.
New York : None of the components are listed.
New Jersey : None of the components are listed.
Pennsylvania : None of the components are listed.
California Prop. 65
WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer.
WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>&lt;0.01</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
<td>7000 µg/day (ingestion) No.</td>
</tr>
<tr>
<td>ethyl acrylate</td>
<td>&lt;0.001</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td></td>
</tr>
</tbody>
</table>

International regulations

International lists : Australia inventory (AICS): All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Canada inventory : All components are listed or exempted.
EU Inventory : All components are listed or exempted.
WHMIS (Canada) : Not controlled under WHMIS (Canada).

Section 16. Other information

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

Flammability
Health
Instability/Reactivity
Special

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

History
Date of issue/Date of revision : 5/20/2015.
# Section 16. Other information

### Key to abbreviations

- **ATE** = Acute Toxicity Estimate
- **BCF** = Bioconcentration Factor
- **GHS** = Globally Harmonized System of Classification and Labelling of Chemicals
- **IATA** = International Air Transport Association
- **IBC** = Intermediate Bulk Container
- **IMDG** = International Maritime Dangerous Goods
- **LogPow** = logarithm of the octanol/water partition coefficient
- **MARPOL 73/78** = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. (*"Marpol"* = marine pollution)
- **UN** = United Nations

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**Date of issue/Date of revision:** 5/20/2015
Univar USA Inc Material Safety Data Sheet

MSDS No: OZ34514
Version No: 009 2009-09-24
Order No: 

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300
MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Distributed by:
Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
425-889-3400

Trade Name: HYDROCHLORIC ACID (HCl) (ALL GRADES)

Synonyms: Muriatic Acid
HCl Solution
Aqueous hydrogen chloride

Product Use: Process chemical, Metal cleaning, Water purification, Petroleum Industry

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Color: Colorless
Physical State: Liquid
Appearance: Clear
Odor: Irritating, Pungent, Sharp
Signal Word: Danger

MAJOR HEALTH HAZARDS: CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN AND EYES. CAUSES PERMANENT EYE DAMAGE. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

PHYSICAL HAZARDS: May spatter or generate heat when mixed with water. Contact
PRECAUTIONARY STATEMENTS: Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Use only with adequate ventilation.

2. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

Inhalation: May cause irritation (possibly severe), chemical burns, and pulmonary edema.

Skin contact: May cause irritation (possibly severe) and chemical burns.

Eye contact: May cause irritation (possibly severe), chemical burns, eye damage, and blindness. Ingestion: Not a likely route of exposure.

Target Organs Effected: Respiratory System, Skin, Eye

Chronic Effects: Repeated or prolonged exposure to dilute solutions may result in dermatitis. Discoloration of the teeth may occur as a result of long term exposure.

Interaction with Other Chemicals Which Enhance Toxicity: None known

Medical Conditions Aggravated by Exposure: None known

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>Concentration (by weight %)</th>
<th>CAS - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>63</td>
<td>7732-18-5</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>9 - 36</td>
<td>7647-01-0</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at
least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Not a likely route of exposure.

5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard.

Extinguishing Media: Use media appropriate for surrounding fire

Fire Fighting: Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Flash point: Not flammable

Hazardous Combustion Products: Hydrogen chloride, Chlorine, Hydrogen gas

6. ACCIDENTAL RELEASE MEASURES

Occupational Release:
Remove sources of ignition. Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Stop leak if possible without personal risk. Consider evacuation of personnel located downwind if material is leaking. Shut off ventilation system if needed. Completely contain spilled material with dikes, sandbags, etc. Neutralize with soda ash or dilute caustic soda. Collect with appropriate absorbent and place into suitable container. Liquid material may be removed with a properly rated vacuum truck. Keep out of water supplies and sewers. This material is acidic and may lower the pH of the surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Storage Conditions: Store and handle in accordance with all current regulations and standards. Store in rubber-lined steel, acid-resistant plastic or glass containers. Keep container tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Keep away from heat, sparks and open flames. Keep separated from incompatible substances. Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from physical damage. Dike and vent storage tanks.
Handling Procedures: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OSHA Regulatory Exposure limit(s):

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CAS-No.</th>
<th>OSHA Final PEL TWA</th>
<th>OSHA Final PEL STEL</th>
<th>OSHA Final PEL Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>7647-01-0</td>
<td>5 ppm</td>
<td>7 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Non-Regulatory Exposure Limit(s):
The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CAS-No.</th>
<th>ACGIH TWA</th>
<th>ACGIH STEL</th>
<th>ACGIH Ceiling (Vacated)</th>
<th>OSHA TWA</th>
<th>OSHA STEL</th>
<th>OSHA Ceiling (Vacated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>7647-01-0</td>
<td>2 ppm</td>
<td></td>
<td></td>
<td>5 ppm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ENGINEERING CONTROLS: Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots.

Hand Protection: Wear appropriate chemical resistant gloves

Protective Material Types: Nitrile, Neoprene, Butyl rubber, Polyvinyl chloride (PVC), Responder, Trellchem, Tychem

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>Immediately Dangerous to Life/ Health (IDLH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>50 ppm IDLH</td>
</tr>
</tbody>
</table>

Respiratory Protection: A NIOSH approved full-face respirator equipped with acid gas cartridges (appropriate for hydrogen chloride) may be permissible under certain circumstances where airborne concentrations of hydrogen chloride are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. When the level may be above the
IDLH, use an SCBA or pressure-demand supplied air with an auxiliary self-contained escape pack. Pressure-demand SCBA (self-contained breathing apparatus) must be used when there is a potential for uncontrolled release or unknown concentrations. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Irritating, Pungent, Sharp</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>0.3 ppm (causes olfactory fatigue)</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>36.46</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>HCl</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>140 - 221 deg F (60 - 105 deg C)</td>
</tr>
<tr>
<td>Freezing Point/Range</td>
<td>-29 to 5 deg F (-34 to -15 deg C)</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>14.6 - 80 mmHg @ 20 deg C</td>
</tr>
<tr>
<td>Vapor Density (air=1)</td>
<td>1.3 @ 20 deg C</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>1.05 - 1.18</td>
</tr>
<tr>
<td>Density</td>
<td>8.75 - 9.83 lbs/gal</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>100%</td>
</tr>
<tr>
<td>pH</td>
<td>2 (0.2% solution)</td>
</tr>
<tr>
<td>Volatility</td>
<td>9 - 36% by volume</td>
</tr>
<tr>
<td>Evaporation Rate (ether=1)</td>
<td>&lt; 1.00 (butyl acetate=1)</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity/ Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Avoid contact with water. Will react with some metals forming flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Avoid contact with incompatible materials.

Incompatibilities/Materials to Avoid: Metals, Alkalis, Oxidizing agents, Mercuric sulfate, Perchloric acid, Carbides of calcium, cesium, rubidium, Acetylides of cesium and rubidium, Phosphides of calcium and uranium, Lithium Silicide

Hazardous Decomposition Products: Chlorine, Hydrogen chloride, Hydrogen gas

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Standard Draize (Eye): rabbit-eye mild
Standard Draize (Skin): human-skin mild
TOXICITY DATA:

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>LD50 Oral</th>
<th>LC50 Inhalation</th>
<th>LD50 Dermal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>700 mg/kg</td>
<td>3124 ppm (1 hr-Rat)</td>
<td>5010 mg/kg (Rabbit)</td>
</tr>
</tbody>
</table>

TOXICITY:
Inhalation will cause severe irritation and possible burns with coughing and choking. If inhaled deeply, edema and hemorrhage of the lungs may occur. Prolonged exposure may cause discoloration and/or erosion of teeth. Contact with eyes causes immediate severe irritation with possible burns, permanent visual impairment, or total loss of sight. Skin contact with this material may cause severe irritation and corrosion of tissue. Ingestion may cause immediate burns of the mouth, esophagus, and stomach. Ingestion may cause intense pain, nausea, vomiting, bleeding, circulating collapse, shock and death.

CARCINOGENICITY: This product is not classified as a carcinogen by NTP, IARC or OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

LC50 Gambusia affinis: 282 mg/L 96 h
LC50 goldfish: 178 mg/L (1 to 2 hour survival time)
LC50 bluegill: 3.6 mg/L 48 h
LC50 shrimp: 100 330 mg/L

FATE AND TRANSPORT:

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is believed not to persist in the environment. This material is believed to exist in the disassociated state in the environment. If released to soil, hydrogen chloride will sink into the soil. The acid will dissolve some soil material (in particular, anything with a carbonate base) and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table. If released to water, it dissociates almost completely and will be neutralized by natural alkalinity and carbon dioxide.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited toxicity to terrestrial organisms. May decrease pH of waterways and adversely affect aquatic life.

13. DISPOSAL CONSIDERATIONS
Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261.

Hazardous Waste Number(s): D002

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Hydrochloric acid solution
DOT UN NUMBER: UN1789
HAZARD CLASS/ DIVISION: 8
PACKING GROUP: II
LABELING 8
REQUIREMENTS:
DOT RQ (lbs): RQ 5,000 Lbs. (Hydrochloric acid)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Hydrochloric acid solution
UN NUMBER: UN1789
CLASS: 8
PACKING/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS

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

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 4262675.

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CERCLA Reportable Quantities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>5000 lb (final RQ)</td>
</tr>
</tbody>
</table>

EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>EPCRA RQs</th>
<th>Threshold Planning Quantity (TPQs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>5000 lb (EPCRA RQ)</td>
<td>500 lb (TPQ)</td>
</tr>
</tbody>
</table>

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):
Sudden Release of Pressure, Extremely Hazardous, Acute Health Hazard
EPCRA SECTION 313 (40 CFR 372.65):
The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to-Know Reporting requirements.

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>Listed</td>
</tr>
</tbody>
</table>

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):
Hydrogen chloride is regulated under DHS as follows:
- DHS - Release Min. Concentration
- DHS - Release Screening Threshold Quantity
- DHS - Security Issue
- DHS - Theft Screening Threshold Quantity

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):
Not regulated

NATIONAL INVENTORY STATUS

U.S. INVENTORY STATUS (TSCA): All components are listed or exempt

TSCA 12(b): This product is not subject to export notification

CANADIAN DOMESTIC SUBSTANCE LIST (DSL/NDSL): All components are listed.

STATE REGULATIONS
<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>Hydrogen chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Proposition 65 Cancer WARNING:</td>
<td>Not Listed</td>
</tr>
<tr>
<td>California Proposition 65 CRT List - Male reproductive toxin:</td>
<td>Not Listed</td>
</tr>
<tr>
<td>California Proposition 65 CRT List - Female reproductive toxin:</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Massachusetts Right to Know Hazardous Substance List</td>
<td>Listed</td>
</tr>
<tr>
<td>New Jersey Right to Know Hazardous Substance List</td>
<td>sn 1012; sn 2909 (gas only)</td>
</tr>
<tr>
<td>New Jersey Special Health Hazards Substance List</td>
<td>corrosive</td>
</tr>
<tr>
<td>New Jersey - Environmental Hazardous Substance List</td>
<td>Listed</td>
</tr>
<tr>
<td>Pennsylvania Right to Know Hazardous Substance List</td>
<td>Listed</td>
</tr>
<tr>
<td>Pennsylvania Right to Know Special Hazardous Substances</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Pennsylvania Right to Know Environmental Hazard List</td>
<td>Listed</td>
</tr>
<tr>
<td>Rhode Island Right to Know Hazardous Substance List</td>
<td>Listed</td>
</tr>
</tbody>
</table>

CANADIAN REGULATIONS
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>Hydrogen chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada - CEPA Schedule I - Toxic Substance list</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

WHMIS Classification:
E
16. OTHER INFORMATION

Disclaimer:
This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems. HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)
Health: 3  Flammability: 0  Reactivity: 1
NFPA 704 - Hazard Identification Ratings (SCALE 0-4)
Health: 3  Flammability: 0  Reactivity: 1
Notice

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.
Material Safety Data Sheet
Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid
Catalog Codes: SLH1462, SLH3154
CAS#: Mixture.
RTECS: MW4025000
TSCA: TSCA 8(b) inventory: Hydrochloric acid
CI#: Not applicable.
Synonym: Hydrochloric Acid; Muriatic Acid
Chemical Name: Not applicable.
Chemical Formula: Not applicable.

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: 1-800-901-7247
International Sales: 1-281-441-4400
Order Online: ScienceLab.com
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>7647-01-0</td>
<td>20-38</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>62-80</td>
</tr>
</tbody>
</table>

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion. Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target
Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Serious Ingestion:**
Not available.

Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** of metals

**Explosion Hazards in Presence of Various Substances:** Non-explosive in presence of open flames and sparks, of shocks.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:**
Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammable gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrogen gas.

**Special Remarks on Explosion Hazards:**

organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction:
Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetrathionates, Sulfonic acid, Tetraselenium tetranitride, U3P4, Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m3) from OSHA (PEL) [United States] CEIL: 5 from NIOSH CEIL: 7 (mg/m3) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.
**Odor:** Pungent. Irritating (Strong.)

**Taste:** Not available.

**Molecular Weight:** Not applicable.

**Color:** Colorless to light yellow.

**pH (1% soln/water):** Acidic.

**Boiling Point:**
- 108.58 C @ 760 mm Hg (for 20.22% HCl in water)
- 83 C @ 760 mm Hg (for 31% HCl in water)
- 50.5 C (for 37% HCl in water)

**Melting Point:**
- -62.25°C (-80°F) (20.69% HCl in water)
- -46.2 C (31.24% HCl in water)
- -25.4 C (39.17% HCl in water)

**Critical Temperature:** Not available.

**Specific Gravity:**
- 1.1- 1.19 (Water = 1)
- 1.10 (20%and 22% HCl solutions)
- 1.12 (24% HCl solution)
- 1.15 (29.57% HCl solution)
- 1.16 (32% HCl solution)
- 1.19 (37% and 38%HCl solutions)

**Vapor Pressure:** 16 kPa (@ 20°C) average

**Vapor Density:** 1.267 (Air = 1)

**Odor Threshold:** 0.25 to 10 ppm

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether.

**Solubility:** Soluble in cold water, hot water, diethyl ether.

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### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, water

**Incompatibility with various substances:**
Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water.

**Corrosivity:**
Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphate and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalis (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothermic reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the foliowng can cause explosion or ignition on contact or

**Special Remarks on Corrosivity:**
Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinium, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

**Polymerization:** Will not occur.

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### Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.

**Toxicity to Animals:**
Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

**Chronic Effects on Humans:**
Carcinogenic Effects: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

**Other Toxic Effects on Humans:**
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

**Special Remarks on Toxicity to Animals:**
Lowest Published Lethal Doses (LDL/LCL) LDL [Man] - Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

**Special Remarks on Chronic Effects on Humans:**
May cause adverse reproductive effects (fetotoxicity). May affect genetic material.

**Special Remarks on Other Toxic Effects on Humans:**
Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjunctivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

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### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

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### Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

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**Section 14: Transport Information**

**DOT Classification:** Class 8: Corrosive material  
**Identification:** Hydrochloric acid, solution UNNA: 1789 PG: II  
**Special Provisions for Transport:** Not available.

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**Section 15: Other Regulatory Information**

**Federal and State Regulations:**  
Connecticut hazardous material survey.: Hydrochloric acid  
Illinois toxic substances disclosure to employee act: Hydrochloric acid  
Illinois chemical safety act: Hydrochloric acid  
New York release reporting list: Hydrochloric acid  
Rhode Island RTK hazardous substances: Hydrochloric acid  
Pennsylvania RTK: Hydrochloric acid  
Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid  
Massachusetts spill list: Hydrochloric acid  
New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid  
Louisiana RTK reporting list: Hydrochloric acid  
California Director's List of Hazardous Substances: Hydrochloric acid  
TSCA 8(b) inventory: Hydrochloric acid  
TSCA 4(a) proposed test rules: Hydrochloric acid  
SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid  
SARA 313 toxic chemical notification and release reporting: Hydrochloric acid  
CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg)

**Other Regulations:**  
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**  
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).  
CLASS E: Corrosive liquid.

**DSCL (EEC):**  
R34- Causes burns.  
R37- Irritating to respiratory system.  
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**HMIS (U.S.A.):**  
Health Hazard: 3  
Fire Hazard: 0  
Reactivity: 1  
Personal Protection:

**National Fire Protection Association (U.S.A.):**  
Health: 3  
Flammability: 0  
Reactivity: 1  
Specific hazard:

**Protective Equipment:**  
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

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**Section 16: Other Information**
References:

Other Special Considerations: Not available.

Created: 10/09/2005 05:45 PM
Last Updated: 05/21/2013 12:00 PM

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SECTION: 1. Product and company identification

1.1. Product identifier

Product form: Substance
Name: Hydrogen, compressed
CAS No: 1333-74-0
Formula: H2
Other means of identification: Dihydrogen, parahydrogen, refrigerant gas R702, water gas

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture: Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number: Onsite Emergency: 1-800-645-4633
CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification
Flam. Gas 1 H220
Compressed gas H280

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US):

![GHS02](image)
![GHS04](image)

Signal word (GHS-US): DANGER
Hazard statements (GHS-US):
H220 - EXTREMELY FLAMMABLE GAS
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUCCOFICATION
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG08 - BURNS WITH INVISIBLE FLAME

Precautionary statements (GHS-US):
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P271+P403 - Use and store only outdoors or in a well-ventilated place
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG06 - Close valve after each use and when empty
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
## 2.3. Other hazards

Other hazards not contributing to the classification: None.

## 2.4. Unknown acute toxicity (GHS US)

No data available

### SECTION 3: Composition/Information on ingredients

#### 3.1. Substance

**Name**: Hydrogen, compressed

**CAS No**: 1333-74-0

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen</td>
<td>(CAS No) 1333-74-0</td>
<td>99.5 - 100</td>
</tr>
</tbody>
</table>

#### 3.2. Mixture

Not applicable

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

- **First-aid measures after inhalation**: Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

- **First-aid measures after skin contact**: Adverse effects not expected from this product.

- **First-aid measures after eye contact**: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.

- **First-aid measures after ingestion**: Ingestion is not considered a potential route of exposure.

#### 4.2. Most important symptoms and effects, both acute and delayed

No additional information available

#### 4.3. Indication of any immediate medical attention and special treatment needed

None.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media: Carbon dioxide, dry chemical powder, water spray, fog.

#### 5.2. Special hazards arising from the substance or mixture

- **Fire hazard**: EXTREMELY FLAMMABLE GAS. The hydrogen flame is nearly invisible. Hydrogen has a low ignition energy; escaping hydrogen gas may ignite spontaneously. A fireball forms if the gas cloud ignites immediately after release. Hydrogen forms explosive mixtures with air and oxidizing agents.

- **Explosion hazard**: EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

- **Reactivity**: No reactivity hazard other than the effects described below.

#### 5.3. Advice for firefighters

- **Firefighting instructions**: If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device. Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
Protection during firefighting: Compressed gas: asphyxiating. Suffocation hazard by lack of oxygen.

Special protective equipment for fire fighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Specific methods: Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Stop flow of product if safe to do so

Use water spray or fog to knock down fire fumes if possible.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: DANGER: EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents. See section 5. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition if safe to do so. Reduce gas with fog or fine water spray. Stop flow of product if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable gas may spread from leak. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.
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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store only where temperature will not exceed 125°F (52°C). Post “No Smoking/No Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Hydrogen, compressed (1333-74-0)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>Not established</td>
</tr>
<tr>
<td>USA OSHA</td>
<td>Not established</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydrogen (1333-74-0)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>Remark (ACGIH)</td>
</tr>
<tr>
<td>Simple asphyxiant</td>
<td></td>
</tr>
<tr>
<td>USA OSHA</td>
<td>Not established</td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): Inadequate - Use only in a closed system. Use explosion proof equipment and lighting.

Eye protection: Wear safety glasses with side shields.


Thermal hazard protection: None necessary.

Other information: Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling containers.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| Physical state | Gas |
| Appearance | Colorless gas. |
| Molecular mass | 2 g/mol |
| Color | Colorless. |
| Odor | Odorless. |
| Odor threshold | No data available |
| pH | Not applicable. |
| Relative evaporation rate (butyl acetate=1) | No data available |
| Relative evaporation rate (ether=1) | Not applicable. |
| Melting point | -259.2 °C (-434.56°F) |
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Freezing point: No data available
Boiling point: -252.9 °C (-422.97°F)
Flash point: No data available
Critical temperature: -239.9 °C (-399.82°F)
Auto-ignition temperature: 566 °C (1051°F)
Decomposition temperature: No data available
Flammability (solid, gas): No data available
Vapor pressure: Not applicable.
Relative vapor density at 20 °C: No data available
Relative density: No data available
Density: 0.089 g/l (0.0056 lb/ft³) (at STP = 0°C and 1atm)
Relative gas density: 0.07
Solubility: Water: 1.6 mg/l
Log Pow: Not applicable.
Log Kow: Not applicable.
Viscosity, kinematic: Not applicable.
Viscosity, dynamic: Not applicable.
Explosive properties: Not applicable.
Oxidizing properties: None.
Explosion limits: 4 - 77 vol %

9.2. Other information
Gas group: Compressed gas
Additional information: BURNS WITH INVISIBLE FLAME

SECTION 10: Stability and reactivity
10.1. Reactivity
No reactivity hazard other than the effects described below.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

10.6. Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information
11.1. Information on toxicological effects

Acute toxicity: Not classified

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50 inhalation rat (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen, compressed (if) 1333-74-0</td>
<td>&gt; 15000 ppm/1h</td>
</tr>
<tr>
<td>Hydrogen (1333-74-0)</td>
<td></td>
</tr>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>&gt; 15000 ppm/1h</td>
</tr>
</tbody>
</table>

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Skin corrosion/irritation: Not classified

Serious eye damage/irritation: Not classified

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): Not classified

Specific target organ toxicity (repeated exposure): Not classified

Aspiration hazard: Not classified

**SECTION 12: Ecological information**

12.1. Toxicity

Ecology - general: No ecological damage caused by this product.

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Hydrogen, compressed (1333-74-0)</th>
<th>Persistence and degradability: No ecological damage caused by this product.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen (1333-74-0)</td>
<td>Persistence and degradability: No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Hydrogen, compressed (1333-74-0)</th>
<th>BCF fish 1: (no bioaccumulation expected) Log Pow: Not applicable. Log Kow: Not applicable. Bioaccumulative potential: No ecological damage caused by this product.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen (1333-74-0)</td>
<td>BCF fish 1: (no bioaccumulation expected) Log Pow: Not applicable. Log Kow: Not applicable. Bioaccumulative potential: No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Hydrogen, compressed (1333-74-0)</th>
<th>Mobility in soil: No data available. Ecology - soil: No ecological damage caused by this product.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen (1333-74-0)</td>
<td>Mobility in soil: No data available. Ecology - soil: No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

12.5. Other adverse effects

Effect on ozone layer: None

Effect on the global warming: No known effects from this product

**SECTION 13: Disposal considerations**

13.1. Waste treatment methods

Waste disposal recommendations: Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.
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SECTION 14: Transport information

In accordance with DOT
Transport document description: UN1049 Hydrogen, compressed, 2.1
UN-No.(DOT): UN1049
Proper Shipping Name (DOT): Hydrogen, compressed
Class (DOT): 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
Hazard labels (DOT): 2.1 - Flammable gas

DOT Special Provisions (49 CFR 172.102): N89 - When steel UN pressure receptacles are used, only those bearing the “H” mark are authorized

Additional information
Emergency Response Guide (ERG) Number: 115 (UN1049)
Other information: No supplementary information available.
Special transport precautions: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

Transport by sea
UN-No. (IMDG): 1049
Proper Shipping Name (IMDG): HYDROGEN, COMPRESSED
Class (IMDG): 2 - Gases
MFAG-No: 115

Air transport
UN-No. (IATA): 1049
Proper Shipping Name (IATA): Hydrogen, compressed
Class (IATA): 2
Civil Aeronautics Law: Gases under pressure/Gases flammable under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen, compressed (1333-74-0)

<table>
<thead>
<tr>
<th>SARA Section 311/312 Hazard Classes</th>
<th>Hazardous Chemicals Reporting Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden release of pressure hazard</td>
<td>Fire hazard</td>
</tr>
</tbody>
</table>

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
## 15.2. International regulations

### CANADA

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen, compressed</td>
<td>Listed on the Canadian DSL (Domestic Substances List)</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>Listed on the Canadian DSL (Domestic Substances List)</td>
</tr>
</tbody>
</table>

### EU-Regulations

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen, compressed</td>
<td>Listed on the EEC inventory EINECS</td>
</tr>
</tbody>
</table>

### 15.2.2. National regulations

#### Hydrogen, compressed (1333-74-0)

- Listed on the AICS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
- Listed on INSQ (Mexican National Inventory of Chemical Substances)

#### 15.3. US State regulations

<table>
<thead>
<tr>
<th>State</th>
<th>Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California</td>
<td>Proposition 65 - Carcinogens List</td>
</tr>
<tr>
<td>U.S. - California</td>
<td>Proposition 65 - Developmental Toxicity</td>
</tr>
<tr>
<td>U.S. - California</td>
<td>Proposition 65 - Reproductive Toxicity - Female</td>
</tr>
<tr>
<td>U.S. - California</td>
<td>Proposition 65 - Reproductive Toxicity - Male</td>
</tr>
<tr>
<td>U.S. - Massachusetts</td>
<td>Right To Know List</td>
</tr>
<tr>
<td>U.S. - Pennsylvania</td>
<td>RTK (Right to Know)</td>
</tr>
</tbody>
</table>

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm.

#### Hydrogen (1333-74-0)

<table>
<thead>
<tr>
<th>State</th>
<th>Non-significant risk level (NSRL)</th>
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</thead>
<tbody>
<tr>
<td>U.S. - California</td>
<td></td>
</tr>
<tr>
<td>U.S. - California</td>
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<tr>
<td>U.S. - California</td>
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<tr>
<td>U.S. - California</td>
<td></td>
</tr>
<tr>
<td>U.S. - Massachusetts</td>
<td></td>
</tr>
<tr>
<td>U.S. - New Jersey</td>
<td></td>
</tr>
<tr>
<td>U.S. - Pennsylvania</td>
<td></td>
</tr>
</tbody>
</table>

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SECTION 16: Other information

Other information
When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product.

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NFPA health hazard: 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.
NFPA fire hazard: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating
Health: 0 Minimal Hazard - No significant risk to health
Flammability: 4 Severe Hazard
Physical: 3 Serious Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

EN (English US)    SDS ID: P-4604   9/9

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SAFETY DATA SHEET

This Safety Data Sheet conforms to ANSI Z400.5, and to the format requirements and the International Chemical Safety Cards of the Global Harmonizing System.

THIS SDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD)

IMPORTANT: Read this SDS before handling & disposing of this product.
Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

PRODUCT IDENTITY: MAGNESIUM SULFATE 10-40%
SDS NUMBER:        CDS1733
NEW MSDS DATE:    12/22/2010
COMPANY IDENTITY: Univar USA Inc.
COMPANY ADDRESS:  17425 NE Union Hill Road
COMPANY CITY:     Redmond, WA 98052
COMPANY PHONE:    1-425-889-3400
EMERGENCY PHONES: CHEMTREC: 1-800-424-9300 (USA)
                   CANUTEC:  1-613-996-6666 (CANADA)

SECTION 2. HAZARDS IDENTIFICATION

CAUTION

RISK STATEMENTS:
R36 Irritating to eyes and skin.

SAFETY STATEMENTS:
S25 Avoid contact with eyes.

SEE SECTIONS 8, 11 & 12 FOR TOXICOLOGICAL INFORMATION.
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>WT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>23-40</td>
</tr>
<tr>
<td>Magnesium Sulfate, Heptahydrate</td>
<td>7487-88-9</td>
<td></td>
<td>60-90</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

EYE CONTACT:
For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:
In case of contact with skin immediately remove contaminated clothing. Wash with soap & water.

INHALATION:
No significant hazard.

SWALLOWING:
Rinse mouth. GET MEDICAL ATTENTION IMMEDIATELY. Do NOT give liquids to an unconscious or convulsing person.

SECTION 5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION PREVENTIVE MEASURES
Not Applicable.

EXTINGUISHING MEDIA
Use appropriate extinguishing media for surrounding fires.

SPECIAL FIRE FIGHTING PROCEDURES
Water spray may be ineffective on fire but can protect fire-fighters & cool closed containers. Use fog nozzles if water is used. Do not enter confined fire-space without full bunker gear. (Helmet with face shield, bunker coats, gloves & rubber boots). Use NIOSH approved positive-pressure self-contained breathing apparatus.
SECTION 5. FIRE FIGHTING MEASURES (CONTINUED)

UNUSUAL EXPLOSION AND FIRE PROCEDURES
Noncombustible.
Closed containers may explode if exposed to extreme heat.
Applying to hot surfaces requires special precautions.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTIVE MEASURES:
Keep unprotected personnel away.
Wear appropriate personal protective equipment given in Section 8.

ENVIRONMENTAL PRECAUTIONS:
Keep from entering storm sewers and ditches which lead to waterways.

CONTAINMENT AND CLEAN-UP MEASURES:
Stop spill at source. Dike and contain.
Collect leaking & spilled liquid in sealable containers as far as possible.

SECTION 7. HANDLING AND STORAGE

HANDLING
Avoid prolonged or repeated contact.
To minimize static discharge when transferring, ensure electrical continuity by bonding and grounding all equipment. Use an inlet line diameter of at least 3.5 inches (8.9 centimeters) with a maximum flow rate of 1 meter/second.

STORAGE
Isolate from strong oxidants. Do not store above 49 C/120 F.
Keep container tightly closed & upright when not in use to prevent leakage.
SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>TWA (OSHA)</th>
<th>TLV (ACGIH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>None Known</td>
<td>None Known</td>
</tr>
<tr>
<td>Magnesium Sulfate Heptahydrate</td>
<td>7487-88-9</td>
<td>-</td>
<td>None Known</td>
<td>None Known</td>
</tr>
</tbody>
</table>

This product contains no EPA Hazardous Air Pollutants (HAP) in amounts > 0.1%.

RESPIRATORY EXPOSURE CONTROLS
A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z86.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

VENTILATION
- LOCAL EXHAUST: Necessary
- MECHANICAL (GENERAL): Acceptable
- SPECIAL: None
- OTHER: None


PERSONAL PROTECTIONS:
Wear impervious gloves and clothing.

WORK & HYGIENIC PRACTICES:
Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated leather articles. Launder or discard contaminated clothing.
SECTION 9. PHYSICAL & CHEMICAL PROPERTIES

**APPEARANCE:** Liquid, Water-White

**ODOR:** None

**ODOR THRESHOLD:** Not Available

**pH (Neutrality):** 7.0

**MELTING POINT/FREEZING POINT:** Not Available

**BOILING RANGE (IBP, 50%, Dry Point):** 100 °C/212 °F

**FLASH POINT (TEST METHOD):** Not Available

**EVAPORATION RATE (n-BUTYL ACETATE=1):** Not Applicable

**FLAMMABILITY CLASSIFICATION:** Non-Combustible

**LOWER FLAMMABLE LIMIT IN AIR (% by vol):** Not Applicable

**UPPER FLAMMABLE LIMIT IN AIR (% by vol):** Not Available

**VAPOR PRESSURE (mm of Hg)@20 C:** 17.5

**VAPOR DENSITY (air=1):** 0.670

**GRAVITY @ 68/68 F / 20/20 C:**

- **SPECIFIC GRAVITY (Water=1):** 1.052
- **POUNDS/GALLON:** 8.763

**WATER SOLUBILITY:** Complete

**PARTITION COEFFICIENT (n-Octane/Water):** Not Available

**AUTO IGNITION TEMPERATURE:** Not Applicable

**DECOMPOSITION TEMPERATURE:** Not Available

**VOC'S (>0.44 Lbs/Sq In):** 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal

**TOTAL VOC'S (TVOC)*:** 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal

**NONEXEMPT VOC'S (CVOC)*:** 0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal

**HAZARDOUS AIR POLLUTANTS (HAPS):** 0.0 Wt% / 0.0 g/L / 0.000 Lbs/Gal

**NONEXEMPT VOC TOTAL PRESSURE (mm of Hg @ 20 C):** 0.0

* Using California South Coast Air Quality Management District (SCAQMD) Rule 443.1.

SECTION 10. STABILITY & REACTIVITY

**STABILITY**

- Stable under normal conditions.

**CONDITIONS TO AVOID**

- Isolate from extreme heat.

**MATERIALS TO AVOID**

- Isolate from strong oxidizers.

**HAZARDOUS DECOMPOSITION PRODUCTS**

- At very high temperatures, magnesium oxide, sulfur dioxide and sulfur trioxide may be generated.

**HAZARDOUS POLYMERIZATION**

- Will not occur.
SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE HAZARDS

EYE & SKIN CONTACT:
Acute overexposure can cause irritation to skin.
Acute overexposure can cause irritation to eyes.

INHALATION:
No significant hazard.

SWALLOWING:
Swallowing can cause abdominal irritation, nausea, vomiting & diarrhea.

SUBCHRONIC HAZARDS/CONDITIONS AGGRAVATED

CONDITIONS AGGRAVATED
None Known.
CONDITIONS AGGREGATED: None Known.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:
This product has no carcinogens listed by IARC, NTP, NIOSH, OSHA or ACGIH, as of this date, greater or equal to 0.1%.

MAMMALIAN TOXICITY INFORMATION

No mammalian information is available on this product.
SECTION 12. ECOLOGICAL INFORMATION

AQUATIC ANIMAL INFORMATION:
No aquatic environmental information is available on this product.

MOBILITY IN SOIL
Mobility of this material has not been determined.

DEGRADABILITY
This product is completely biodegradable.

ACCUMULATION
Bioaccumulation of this product has not been determined.

SECTION 13. DISPOSAL CONSIDERATIONS

Processing, use or contamination may change the waste management options. Recycle / dispose of observing national, regional, state, provincial and local health, safety & pollution laws. If in doubt, contact appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: None
DRUM LABEL: None
IATA / ICAO: None
IMO / IMDG: None
EMERGENCY RESPONSE GUIDEBOOK NUMBER: None

SECTION 15. REGULATORY INFORMATION

EPA REGULATION:
SARA SECTION 311/312 HAZARDS: None Known

All components of this product are on the TSCA list. This material contains no known products restricted under SARA Title III, Section 313 in amounts greater or equal to 1%.
SECTION 15. REGULATORY INFORMATION (CONTINUED)

INTERNATIONAL REGULATIONS
The components of this product are listed on the chemical inventories of the following countries:
Australia (AICS), Canada (DSL, NDSL), China (IECSC), Europe (EINECS, ELINCS),
Japan (METI/CSCI, MHLW/ISHL), South Korea (KECI), New Zealand (NZIoC),
Philippines (PICCS), Switzerland (SWISS), Taiwan (NECSI), USA (TSCA).

CANADA: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
D2B: Irritating to skin / eyes.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:
HEALTH (NFPA): 1, HEALTH (HMIS): 1, FLAMMABILITY: 0, REACTIVITY: 0
(Personal Protection Rating to be supplied by user based on use conditions.)
This information is intended solely for the use of individuals trained in the NFPA & HMIS hazard rating systems.
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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar’s control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.
MATERIAL SAFETY DATA SHEET

SECTION A: GENERAL INFORMATION

Peñoles Metals & Chemicals, Inc.
2 Stamford Plz, Stamford, CT 06901
Phone (203) 359-6775
Fax: (203) 359-3692

TRADE NAME                 Issue Date: October 14, 2008
CHEMICAL NAME    Magnesium sulfate monohydrate
FORMULA     MgSO₄(H₂O)               Revision Date: Original
MOLECULAR WEIGHT   138.38

SECTION B: PRODUCT COMPOSITION

<table>
<thead>
<tr>
<th>Material or Component</th>
<th>Wt. %</th>
<th>C.A.S. #</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>NIOSH REL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium sulfate monohydrate</td>
<td>99</td>
<td>14168-73-1</td>
<td>* 5.0</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Inert/Insoluble material</td>
<td>&lt; 1.0</td>
<td>NA</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

* The OSHA PEL is for the respirable fraction of dust suspended in air.

SECTION C: FIRST AID MEASURES

INHALATION: Inhaled dust or fume may cause coughing. Remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, administer artificial respiration.

INGESTION: Give several glasses of water.

EYES: Solid and dust may be irritating to the eyes. Hold eyelids open and flush with water for 15 minutes.

SKIN: Remove contaminated clothing. Wash skin with plenty of water.
SECTION D: HEALTH HAZARD INFORMATION

Inhalation: Dust can be irritating.

Ingestion: Can cause abdominal pain, vomiting and diarrhea and hypocalcemia.

Eyes: Dust and fume contact with eyes may cause irritation.

Skin: May cause irritation. Inorganic magnesium sulfate will not be absorbed through the skin.

Medical conditions aggravated: Not noted.

Carcinogenicity information: None.

Other: None noted.

Target organs: Digestive system.

SECTION E: PRECAUTIONS / PROCEDURES

Fire extinguishing agents: Use agents appropriate for the material burning.

Fire extinguishing agents to avoid: None.

Special fire fighting precautions: Expect the production of magnesium oxide and sulfur oxides in fire conditions. Use self-contained breathing apparatus.

Engineering controls: Local exhaust ventilation should be used during operations where dust exposures may occur.

Normal handling: Bulk material should be handled with cotton or leather gloves.

Storage: No special precautions are necessary.

Spill or leak: Minimize dust production and contain the spilled material.

Special precautions, procedures: No additional precautions are necessary.

Personal Hygiene: Practice good housekeeping and personal hygiene procedures. No tobacco, smoking, or food in the work area. Wash thoroughly before leaving the work area, eating, drinking, applying cosmetics or smoking. Avoid ingestion or inhalation. Do not use compressed air for blowing dust off clothing.
SECTION F: PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection:  NIOSH/MSHA approved respirator. Selection of the respiratory protection equipment depends on the concentration and form of magnesium sulfate present. Each workplace where exposure potentials exist must be evaluated to determine the selection of respiratory protection.

Eyes and Face:  Where dusts or fumes exist, goggles should be worn.

Hands, arms and body:  Gloves. Cotton or Leather when handling bulk material

Other clothing and equipment:  None.

SECTION G: PHYSICAL DATA

<table>
<thead>
<tr>
<th>Physical State at 76 deg F</th>
<th>Solid</th>
<th>Vapor Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Transparent crystals or white powder</td>
<td>Solubility in water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.0 – 7.5</td>
</tr>
<tr>
<td>Melting Point</td>
<td>1124 deg C 2055 deg F</td>
<td>Vapor Pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>NA</td>
<td>Evaporation Rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1)</td>
<td>2.16</td>
<td>Volatiles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Lower Explosive Limit</td>
<td>NA</td>
<td>Upper Explosive Limit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>

SECTION H: REACTIVITY DATA

Stability:  Stable.

Conditions to avoid:  Avoid creating dusts or exposing magnesium sulfate to high temperatures.

Incompatibilities:  None noted.

Decomposition products:  Water (steam), magnesium oxide and sulfur oxides.

Hazardous polymerization:  Does not occur.
SECTION I: ENVIRONMENTAL

EPA Hazardous Substance? No.

Waste disposal methods: None.

DOT hazard classification: None

DOT label required: None

DOT Identification number: None

This material may be subject to the following SARA Title III requirements depending on the quantities processed or stored:

40 CFR 355.30 Emergency Planning
40 CFR 370 Hazardous Chemical reporting

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SECTION J: REFERENCES


U.S. Department of Health and Human Services (DHHS/PHS). Registry of Toxic Effects of Chemical Substances_NIOSH Publication No.86-103


Section 1: Identification

Product Identifier: **Megaflow™ AW HVI Hydraulic Oil 22, 32, 46, 68, 100**

Other means of identification:
- Megaflow™ AW HVI Hydraulic Oil 22
- Megaflow™ AW HVI Hydraulic Oil 32
- Megaflow™ AW HVI Hydraulic Oil 46
- Megaflow™ AW HVI Hydraulic Oil 68
- Megaflow™ AW HVI Hydraulic Oil 100

SDS Number: **814633**

Uses Advised Against: All others

Emergency Health and Safety Number:
- CHEMTREC 800-424-9300 (24 Hours)
- CANUTEC 613-996-6666
- CHEMTREC Mexico 01-800-681-9531

Manufacturer:
Phillips 66 Lubricants
P.O. Box 4428
Houston, TX 77210

SDS Information:
Phone: 800-762-0942
Email: SDS@P66.com
URL: www.Phillips66.com

Customer Service:
U.S.: 1-800-822-6457 or International: +1-83-2486-3363

Technical Information: 1-877-445-9198

Section 2: Hazards Identification

Classified Hazards
This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Other Hazards
None Known

Section 3: Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CASRN</th>
<th>Concentration¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillates, petroleum, hydrotreated heavy paraffinic</td>
<td>64742-54-7</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Distillates, petroleum, hydrotreated light paraffinic</td>
<td>64742-55-8</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Non-Hazardous Materials</td>
<td>VARIOUS</td>
<td>&lt;15</td>
</tr>
</tbody>
</table>

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician)

Inhalation (Breathing): First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.
Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation. Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities. When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Minimal)</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for firefighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).
Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Keep container(s) tightly closed and properly labeled. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillates, petroleum, hydrotreated heavy paraffinic</td>
<td>TWA: 5mg/m³ STEL: 10 mg/m³ as Oil Mist, if Generated</td>
<td>TWA: 5mg/m³ as Oil Mist, if Generated</td>
<td>---</td>
</tr>
<tr>
<td>Distillates, petroleum, hydrotreated light paraffinic</td>
<td>TWA: 5mg/m³ STEL: 10 mg/m³ as Oil Mist, if Generated</td>
<td>TWA: 5mg/m³ as Oil Mist, if Generated</td>
<td>---</td>
</tr>
</tbody>
</table>

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/face Protection: The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

Skin/Hand Protection: The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).
Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

### Section 9: Physical and Chemical Properties

**Note:** Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Amber, Transparent</td>
</tr>
<tr>
<td>Physical Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor: Petroleum</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No data</td>
</tr>
<tr>
<td>pH: Not applicable</td>
<td></td>
</tr>
<tr>
<td>Vapor Density (air=1):</td>
<td>&gt;1</td>
</tr>
<tr>
<td>Upper Explosive Limits (vol % in air):</td>
<td>No data</td>
</tr>
<tr>
<td>Lower Explosive Limits (vol % in air):</td>
<td>No data</td>
</tr>
<tr>
<td>Evaporation Rate (nBuAc=1):</td>
<td>No data</td>
</tr>
<tr>
<td>Particle Size</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Percent Volatile</td>
<td>Negligible</td>
</tr>
<tr>
<td>Flammability (solid, gas):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in Water:</td>
<td>Negligible</td>
</tr>
<tr>
<td>Flash Point</td>
<td>&gt; 284 °F / &gt; 140 °C</td>
</tr>
<tr>
<td>Test Method</td>
<td>Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010</td>
</tr>
<tr>
<td>Initial Boiling Point/Range:</td>
<td>No data</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>&lt;1 mm Hg</td>
</tr>
<tr>
<td>Partition Coefficient (n-octanol/water) (Kow):</td>
<td>No data</td>
</tr>
<tr>
<td>Melting/Freezing Point:</td>
<td>&lt; -31 °F / &lt; -35 °C</td>
</tr>
<tr>
<td>Auto-ignition Temperature</td>
<td>No data</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>No data</td>
</tr>
<tr>
<td>Specific Gravity (water=1):</td>
<td>0.86-0.88 @ 60°F (15.6°C)</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>7.14 - 7.32 lbs/gal</td>
</tr>
<tr>
<td>Viscosity</td>
<td>4 - 14 cSt @ 100°C; 22 - 108 cSt @ 40°C</td>
</tr>
<tr>
<td>Pour Point</td>
<td>&lt; -31 °F / &lt; -35 °C</td>
</tr>
</tbody>
</table>

### Section 10: Stability and Reactivity

**Reactivity:** Not chemically reactive.

**Chemical stability:** Stable under normal ambient and anticipated conditions of use.

**Possibility of hazardous reactions:** Hazardous reactions not anticipated.

**Conditions to avoid:** Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

**Incompatible materials:** Avoid contact with strong oxidizing agents and strong reducing agents.

**Hazardous decomposition products:** Not anticipated under normal conditions of use.

### Section 11: Toxicological Information

#### Information on Toxicological Effects of Substance/Mixture

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Acute Toxicity</th>
<th>Hazard</th>
<th>Additional Information</th>
<th>LC50/LD50 Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Unlikely to be harmful</td>
<td></td>
<td></td>
<td>&gt;5 mg/L (mist, estimated)</td>
</tr>
<tr>
<td>Dermal</td>
<td>Unlikely to be harmful</td>
<td></td>
<td></td>
<td>&gt; 2 g/kg (estimated)</td>
</tr>
<tr>
<td>Oral</td>
<td>Unlikely to be harmful</td>
<td></td>
<td></td>
<td>&gt; 5 g/kg (estimated)</td>
</tr>
</tbody>
</table>

**Aspiration Hazard:** Not expected to be an aspiration hazard.

**Skin Corrosion/Irritation:** Not expected to be irritating. Repeated exposure may cause skin dryness or cracking.

**Serious Eye Damage/Irritation:** Not expected to be irritating.

**Skin Sensitization:** No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

**Respiratory Sensitization:** No information available.

**Specific Target Organ Toxicity (Single Exposure):** No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).
Specific Target Organ Toxicity (Repeated Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

**Lubricant Base Oil (Petroleum)**

**Carcinogenicity:** The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

---

**Section 12: Ecological Information**

**GHS Classification:**
No classified hazards

**Toxicity:** All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

**Persistence and Degradability:** The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

**Bioaccumulative Potential:** Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

**Mobility in Soil:** Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

**Other adverse effects:** None anticipated.

---

**Section 13: Disposal Considerations**

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste. This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

---

**Section 14: Transport Information**

**U.S. Department of Transportation (DOT)**

**Shipping Description:** Not regulated

**Note:** If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)

---

**International Maritime Dangerous Goods (IMDG)**
Shipping Description: Not regulated
Note: U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:
Not applicable

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)
UN/ID #: Not regulated
Note: U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 24.

<table>
<thead>
<tr>
<th>Packaging Instruction #</th>
<th>LTD. QTY</th>
<th>Passenger Aircraft</th>
<th>Cargo Aircraft Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Max. Net Qty. Per Package: ---

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

<table>
<thead>
<tr>
<th>Acute Health Hazard:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Health Hazard:</td>
<td>No</td>
</tr>
<tr>
<td>Fire Hazard:</td>
<td>No</td>
</tr>
<tr>
<td>Pressure Hazard:</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard:</td>
<td>No</td>
</tr>
</tbody>
</table>

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Concentration¹</th>
<th>de minimis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc Compound(s)</td>
<td>1.0 - 1.5</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

EPA (CERCLA) Reportable Quantity (in pounds):
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Hazard Classification

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

WHMIS Hazard Class:
none

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA. All components are either on the DSL, or are exempt from DSL listing requirements.

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

<table>
<thead>
<tr>
<th>Date of Issue:</th>
<th>Previous Issue Date:</th>
<th>SDS Number:</th>
<th>Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-Jun-2014</td>
<td>26-Jul-2013</td>
<td>814633</td>
<td>FINAL</td>
</tr>
</tbody>
</table>
Revised Sections or Basis for Revision:
Composition (Section 3); Regulatory information (Section 15)

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.
Material Safety Data Sheet

1. Identification of the material and supplier

Product name  Bynorm 4 Stroke Engine Oil 10W30 (Semi Synthetic)
Other Names
Product use  Lubricant for lawnmowers, ride on mowers & stationary engines.
Supplier  Peak Lubricants Pty Ltd
          224-230 South Gippsland Hwy
          Dandenong
          Victoria 3175
          ABN 74887410101
Telephone  (03) 9799 0977

EMERGENCY TELEPHONE NUMBER  (03) 9799 0977

2. Hazards identification

Statement of hazardous/dangerous nature
NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS

While this material is not considered to be hazardous, it should be handled in accordance with good industrial hygiene and safety practices.

Safety Phrase
S2- Keep out of the reach of children.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>Highly refined mineral base oil</td>
</tr>
<tr>
<td>30%</td>
<td>Synthesized hydrocarbons</td>
</tr>
<tr>
<td>20%</td>
<td>Other ingredients</td>
</tr>
</tbody>
</table>

This product does not contain any hazardous ingredients at or above regulated thresholds.

4. First-aid measures

Skin contact
Immediately wash exposed skin with soap and water. Remove contaminated clothing and shoes.
Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation develops.

Inhalation
If inhaled, remove to fresh air. Get medical attention if symptoms appear.

Eye contact
In case of contact, immediately flush eyes with a copious amount of water for at least 15 minutes. Get medical attention if irritation occurs.

Ingestion
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately.

Notes to physician
5. Fire-fighting measures

Extinguishing Media Suitable
In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray.

Do not use water jet.

Protection of fire-fighters
Fire-fighters should wear self-contained positive pressure breathing apparatus (SCBA) and full turnout gear.

Special fire-fighting procedures
None identified

Unusual fire/explosion Hazards
This material is not explosive as defined by established regulatory criteria.

Hazards from combustion products
Decomposition products may include the following materials:
- carbon oxides
- sulfur oxides
- phosphorus oxides
- metal oxide/oxides

6. Accidental release measures

Emergency Procedures
Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and clean-up
If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilt material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.

Large Spill
Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small Spill
Stop leak if without risk. Move containers from spill area. Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling
Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

Storage
Keep container tightly closed. Keep container in a cool, well-ventilated area. Store under cover away from heat and sources of ignition. Reference should be made to Australian Standard AS1940- The storage and handling of flammable and combustible liquids.

Additional information-Storage
Classified as combustible liquid Class C2 (AS 1940).
Product contaminated rags paper or material used to absorb spillages represent a fire hazard and should not be allowed to accumulate. Dispose of safely immediately after use.

8. Exposure controls/personal protection
Ingredient name Occupational exposure limits
Base oil - unspecified NOHSC (Australia). TWA: 5 mg/m³ 8 hour(s). Form: Oil mist, mineral.

Whilst specific OELs for certain components are included in this data sheet, it should be noted that other components of the preparation will be present in any mist, vapour or dust produced. For this reason, the specific OELs may not be applicable to the product and are provided for guidance purposes.

Control Measures
Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.

Hygiene measures
Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Biological Limit Values
No biological limit allocated.

Personal protective equipment

Hands
Wear protective gloves if prolonged or repeated contact is likely. Chemical resistant gloves. Recommended: Nitrile gloves.
The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Eyes
Safety glasses with side shields.

Skin and Body
Avoid prolonged or repeated contact with skin. Wear protective clothing if prolonged or repeated contact is likely.

Respiratory system
Avoid breathing of vapours, mists or spray. Select and use respirators in accordance with AS/NZS 1715/1716. When mists or vapours exceed the exposure standards then the use of the following is recommended: Approved respirator with organic vapour and dust/mist (Type P1) filters. Filter capacity and respirator type depends on exposure level

9. Physical and chemical properties

Flash point > 200 °C
Colour Amber
Physical state Liquid
Density 0.876 kg/L
Solubility Insoluble in water
pH Not applicable
Viscosity 75 cst @ 40°C

10. Stability and reactivity

Hazardous polymerization
Will not occur

Stability
This product is stable

Conditions to Avoid
Keep away from fire, extreme heat, and oxidising compounds

Incompatibility with various substances/Hazardous Reactions
Reactive with oxidizing compounds
Hazardous Decomposition Products
Decomposition products may include the following materials:
carbon oxides
sulfur oxides
phosphorus oxides
metal oxide/oxides

11 . Toxicological information
Effects and symptoms
Eyes
Unlikely to cause more than transient stinging or redness if accidental eye contact occurs.

Skin
Prolonged or repeated contact can de-fat the skin and lead to irritation and/or dermatitis.

Inhalation
Inhalation of oil mist or vapours at elevated temperatures may cause respiratory irritation.

Ingestion
Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhoea.

Carcinogenic effects
No component of this product at levels greater than or equal to 0.1% is identified as a carcinogen by ACGIH, the International Agency for Research on Cancer (IARC), the European Commission (EC), or the National Occupational Health and Safety Commission (Australia).

12 . Ecological information

Ecotoxicity
Not classified as environmentally hazardous in accordance with the ‘Approved Criteria for Classifying Hazardous Substances’ [NOHSC (1008)/2004 as amended and adapted].

Biodegradability
The biodegradability of this material has not been determined.

Mobility
Spillages may penetrate the soil causing ground water contamination.

Other ecological information
Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

13 . Disposal considerations

Disposal Consideration / Waste information
Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Dispose of in accordance with all applicable local and national regulations.

Special Precautions for Landfill or Incineration
No additional special precautions identified.

14 . Transport information
Not classified as dangerous for transport (ADG, IMDG, ICAO/IATA).

Special precautions for user
No known special precautions required. See Section: "Handling and storage" for additional information.

15 . Regulatory information
Standard for the Uniform Scheduling of Drugs and Poisons
Not regulated.

Control of Scheduled Carcinogenic Substances
Ingredient name Schedule
No Listed Substance

Inventories

Other regulations

16. Other information

Prepared by Peak Technical Advice

Notice to reader

The information sourced for the preparation of this document was correct and complete at the time of writing to the best of the writer’s knowledge. The document represents the commitment to the company’s responsibilities surrounding the supply of this product, undertaken in good faith. This document should be taken as a safety guide for the product and its recommended uses, but is in no way an absolute authority. Please consult the relevant legislation and regulations governing the use and storage of this type of product. For further information, please contact Peak Lubricants.

Key to abbreviations
AMP = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists, an agency that promulgates exposure standards.
ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail
ADG Code = Australian Code for the Transport of Dangerous Goods by Road and Rail
CAS Number = Chemical Abstracts Service Registry Number
HAZCHEM Code = Emergency action code of numbers and letters which gives information to emergency services. Its use is required by the ADG Code for Dangerous Goods in bulk.
ICAO = International Civil Aviation Organization.
IATA = International Air Transport Association, the organization promulgating rules governing shipment of goods by air.
IMDG = International Maritime Organization Rules, rules governing shipment of goods by water.
IP 346 = A chemical screening assay for dermal toxicity. The European Commission has recommended that Method IP 346 be used as the basis for labelling certain lubricant oil base stocks for carcinogenicity. The EU Commission has stipulated that the classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346. (See Note L, European Commission Directive 67/548/EEC as amended and adapted.) DMSO is a solvent.
NOHSC = National Occupational Health & Safety Commission, Australia
TWA = Time weighted average
STEL = Short term exposure limit
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.
Dear Valued Customer,

Please find enclosed Material Safety Data Sheet(s), MSDS, or a SARA 313 notification (U.S. customers) for the following product(s):

Nitrogen (Refrigerated) 300000000100 1.11

An MSDS will provide the information that is necessary for personnel training in the proper and safe handling, storage, transport and use of the product(s). Please ensure that the relevant MSDS(s) are circulated to the appropriate personnel that are responsible for MSDS management and training for your site and/or company. For additional information, please visit our Product Stewardship web site at http://www.airproducts.com/productstewardship/

A SARA 313 notification is provided in pursuant to 40 CFR Part 372, Toxic Chemical Release Reporting: Community Right-To-Know. This notification is being provided to assist with your reporting obligations under this regulation. If applicable, this information can also be found in Section 15 of the MSDS for the product.

Thank you for your order.

Air Products and Chemicals, Inc.
1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Nitrogen (Refrigerated)

Chemical formula: N2

Synonyms: Nitrogen (refrigerated), Liquid Nitrogen, LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen

Product Use Description: General Industrial

Manufacturer/Importer/Distributor: Air Products and Chemicals, Inc.
7201 Hamilton Blvd.
Allentown, PA 18195-1501
GST No. 123600625 RT0001
GST No. 102763981 TG0001

Telephone: 1-810-491-4911 Corporate
1-900-345-3148 Chemicals Cust Serv
1-800-752-1597 Gases/Electronics Cust Serv

Emergency telephone number (24h): 800-523-9374 USA.
+1 610 481 7711 International

2. HAZARDS IDENTIFICATION

GHS classification:
- Gases under pressure - Refrigerated liquefied gas
- Simple Asphyxiant

GHS label elements:
- Hazard pictograms/symbols

Signal Word: Warning

Hazard Statements:
H281: Contains refrigerated gas; may cause cryogenic burns or injury. 
May displace oxygen and cause rapid asphyxiation.

Precautionary Statements:

**Prevention**
- P262: Wear cold insulating gloves, face shield, eye protection.

**Response**
- P315: Get immediate medical advice/attention.
- P356: Thaw frozen parts with lukewarm water. Do not rub affected area.

**Storage**
- P403: Store in a well-ventilated place.

Hazards not otherwise classified

- Extremely cold liquid and gas under pressure.
- Direct contact with liquid can cause frostbite.
- Can cause rapid asphyxiation.
- Avoid breathing gas.
- Self-contained breathing apparatus (SCBA) may be required.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Concentration (Volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications.

4. FIRST AID MEASURES

**General advice**
- Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

**Eye contact**
- In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- Keep eye wide open while rinsing.

**Skin contact**
- In case of frostbite, obtain medical treatment immediately. As soon as practical, place the affected area in a warm water bath which has a temperature not to exceed 40 °C (104 °F). Do not rub frozen parts as tissue damage may result.
- Cover wound with sterile dressing.

**Ingestion**
- Ingestion is not considered a potential route of exposure.

**Inhalation**
- Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped,
5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: All known extinguishing media can be used.

Specific hazards: Spill will rapidly vaporize forming an oxygen deficient vapor cloud. Vapor cloud may obscure visibility. Do not direct water spray at container vent. Move away from container and cool with water from a protected position. Keep container and surroundings cool with water spray.

Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Evacuate personnel to safe areas. Ventilate the area. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Protective Equipment: Wear self-contained breathing apparatus when entering area.

Emergency Procedures: Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Do not discharge into any place where its accumulation could be dangerous.

Environmental precautions: Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Do not discharge into any place where its accumulation could be dangerous.

Methods for cleaning up: Ventilate the area.

Additional advice: If possible, stop flow of product. Increase ventilation to the release area and monitor oxygen level. Vapor cloud may obscure visibility. Do not spray water directly at leak. If leak is from cylinder or cylinder valve, call the Air Products emergency telephone number. If the leak is in the user's system, close the cylinder valve and safety vent the pressure before attempting repairs.

7. HANDLING AND STORAGE

Handling:

Know and understand the properties and hazards of the product before use. Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Close container valves after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. If user experiences any difficulty operating cylinder valve discontinue...
use and contact supplier. Do not remove or interchange connections. Ensure the complete gas system has been checked for leaks before use. Prevent entrapment of cryogenic liquid in closed systems not protected with relief device. A small quantity of liquid produces large volumes of vaporized gas at atmospheric pressure.

Containers used in shipment, storage, and transfer of cryogenic liquid are specially designed, well-insulated containers equipped with a pressure relief device and valves to control pressure. Under normal conditions, these containers will periodically vent product to limit pressure buildup. Ensure that the container is in a well-ventilated area to avoid creating an oxygen-deficient atmosphere. Use adequate pressure relief in systems and piping to prevent pressure buildup; liquid in a closed container can generate extremely high pressures when vaporized by warming. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Only transfer lines designed for cryogenic liquids shall be used. Do not subject containers to abnormal mechanical shock. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier.

Storage

Use a back flow preventative device in the piping. Do not change or force fit connections. Close valve after each use and when empty. Always keep container in upright position. Read and follow the Safety Data Sheet (SDS) before use. Do not allow storage temperature to exceed 50°C (122°F). Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Full containers should be stored so that oldest stock is used first. Do not store in a confined space. Full and empty cylinders should be segregated. Store containers in location free from fire risk and away from sources of heat and ignition. Return empty containers in a timely manner. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Cryogenic containers are equipped with pressure relief devices to control internal pressure. Under normal conditions these containers will periodically vent product. All vents should be piped to the exterior of the building. Observe all regulations and local requirements regarding storage of containers.

For further information on storage, handling, and use, consult Air Products' Safetygram 7: Liquid Nitrogen, available on our website at www.airproducts.com.

6. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures:

Natural or mechanical to prevent oxygen deficient atmospheres below 19.5% oxygen.
Keep self contained breathing apparatus readily available for emergency use.

Personal protective equipment

Respiratory protection: Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere.
Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.

Hand protection: Wear working gloves when handling gas containers.
If the operation involves possible exposure to a cryogenic liquid, wear loose fitting thermal insulated or cryo-gloves.
Chemical resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eye protection: Safety glasses recommended when handling cylinders. Protect eyes, face and skin from liquid splashes. Wear goggles and a face shield when transferring or breaking transfer connections.

Skin and body protection: Never allow any unprotected part of the body to touch uninsulated pipes or vessels which contain cryogenic fluids. The extremely cold metal will cause the flesh to stick fast and tear when one attempts to withdraw from it. Safety shoes are recommended when handling cylinders.

Special instructions for protection and hygiene: Ensure adequate ventilation, especially in confined areas.

Remarks: Simple asphyxiant.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquefied gas. Colorless.

Odor: No odor warning properties.

Odor threshold: No data available.

pH: Not applicable.

Melting point/range: -346 °F (-210 °C)

Boiling point/range: -321 °F (-196 °C)

Flash point: Not applicable.

Evaporation rate: Not applicable.

Flammability (solid, gas): Refer to product classification in Section 2.

Uppper/lower explosion/flammability limit: No data available.

Vapor pressure: Not applicable.

Water solubility: 0.02 g/1

Relative vapor density: 0.97 (air = 1)

Relative density: 0.8 (water = 1)

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

Nitrogen (Refrigerated)
10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions.
Conditions to avoid: No data available.
Materials to avoid: Carbon steel.
Hazardous decomposition products: No data available.
Possibility of hazardous reactions/Reactivity: No data available.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Likely routes of exposure:
- Effects on Eye: Contact with liquid may cause cold burns/frostbite.
- Effects on Skin: Contact with liquid may cause cold burns/frostbite. May cause severe frostbite.
- Inhalation Effects: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
- Ingestion Effects: Ingestion is not considered a potential route of exposure.
- Symptoms: Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness, Salivation, Nausea, Vomiting, Loss of mobility/consciousness.

Acute toxicity:
- Acute Oral Toxicity: No data is available on the product itself.
- Inhalation: No data is available on the product itself.
- Acute Dermal Toxicity: No data is available on the product itself.
Skin corrosion/irritation: No data available.
Serious eye damage/eye irritation: No data available.
Sensitization: No data available.

Chronic toxicity or effects from long term exposures:
- Carcinogenicity: No data available.
- Reproductive toxicity: No data is available on the product itself.
- Germ-cell mutagenicity: No data is available on the product itself.
- Specific target organ systemic toxicity (single exposure): No data available.
- Specific target organ systemic toxicity (repeated exposure): No data available.
- Aspiration hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects:
- Aquatic toxicity: Not applicable.
- Toxicity to other organisms: Not applicable.

Persistence and degradability:
- Biodegradability: No data is available on the product itself.
- Mobility: No data available.
- Bioaccumulation: No data is available on the product itself.

13. DISPOSAL CONSIDERATIONS

Air Products and Chemicals, Inc
Nitrogen (Refrigerated)
Waste from residues / unused products: Return unused product in original cylinder to supplier. Contact supplier if guidance is required.
Contaminated packaging: Return cylinder to supplier.

14. TRANSPORT INFORMATION

DOT

<table>
<thead>
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<th>UN/ID No.</th>
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<tr>
<td>Class or Division</td>
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<tr>
<td>Label(s)</td>
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<tr>
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IATA

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<td>2.2</td>
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<tr>
<td>Label(s)</td>
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IMDG

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TDG

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<tr>
<td>Label(s)</td>
<td>2.2</td>
</tr>
<tr>
<td>Marine Pollutant</td>
<td>No</td>
</tr>
</tbody>
</table>

Further Information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

15. REGULATORY INFORMATION

Air Products and Chemicals, Inc

Nitrogen (Refrigerated)
Safety Data Sheet

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

<table>
<thead>
<tr>
<th>Country</th>
<th>Regulatory list</th>
<th>Notification</th>
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<tr>
<td>USA</td>
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<tr>
<td>EU</td>
<td>EINECS</td>
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<tr>
<td>Canada</td>
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<td>AICS</td>
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<tr>
<td>Japan</td>
<td>ENCS</td>
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</table>

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification
Acute Health Hazard

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level
None.

US, California, Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

16. OTHER INFORMATION

NFPA Rating
Health: 3
Fire: 3
Instability: 0

HMIS Rating
Health: 3
Flammability: 0
Physical Hazard: 2

Prepared by: Air Products and Chemicals, Inc. Global EH&S Product Safety Department

Telephone: 1-610-461-4911 Corporate
           1-800-345-3148 Chemicals Cust Serv
           1-800-752-1597 Gases/Electronics Cust Serv

Preparation Date: 03/13/2015

For additional information, please visit our Product Stewardship web site at
http://www.airproducts.com/productstewardship/

Air Products and Chemicals, Inc.

Nitrogen (Refrigerated)
SAFETY DATA SHEET

Nitrogen

Section 1. Identification

GHS product identifier : Nitrogen
Chemical name : nitrogen
Other means of identification : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG
Product use : Synthetic/Analytical chemistry.
Synonym : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG
SDS # : 001040
Supplier’s details : Airgas USA, LLC and its affiliates
                      259 North Radnor-Chester Road
                      Suite 100
                      Radnor, PA 19087-5283
                      1-610-687-5253
Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard
Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms : 

Signal word : Warning
Hazard statements : Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statements

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

Prevention : Use and store only outdoors or in a well ventilated place.
Response : Not applicable.
Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal : Not applicable.
Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Date of issue/Date of revision : 11/11/2014. Date of previous issue : 10/16/2014. Version : 0.05 1/11
Section 3. Composition/information on ingredients

Substance/mixture: Substance
Chemical name: nitrogen
Other means of identification: nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG

CAS number/other identifiers
- CAS number: 7727-37-9
- Product code: 001040

Ingredient name | % | CAS number
--- | --- | ---
Nitrogen | 100 | 7727-37-9

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact: Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation: Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact: Contact with rapidly expanding gas may cause burns or frostbite.
Frostbite: Try to warm up the frozen tissues and seek medical attention.
Ingestion: As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact: No specific data.
Inhalation: No specific data.
Skin contact: No specific data.
Ingestion: No specific data.
## Section 4. First aid measures

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

**Notes to physician**
- In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Specific treatments**
- No specific treatment.

**Protection of first-aiders**
- No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

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

**Specific hazards arising from the chemical**
- Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

**Hazardous thermal decomposition products**
- Decomposition products may include the following materials:
  - nitrogen oxides

**Special protective actions for fire-fighters**
- Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

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

## Section 6. Accidental release measures

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

**For non-emergency personnel**
- No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders**
- If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions**
- Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods and materials for containment and cleaning up**

**Small spill**
- Immediately contact emergency personnel. Stop leak if without risk.

**Large spill**
- Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
**Section 7. Handling and storage**

**Precautions for safe handling**

**Protective measures**: Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

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

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

**Section 8. Exposure controls/personal protection**

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>Oxygen Depletion [Asphyxiant]</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**

**Environmental exposure controls**: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

**Individual protection measures**

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

**Eye/face protection**: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
Section 8. Exposure controls/personal protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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

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

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

Section 9. Physical and chemical properties

Appearance

Physical state: Gas. [Compressed gas.]
Color: Colorless.
Molecular weight: 28.02 g/mole
Molecular formula: N2
Boiling/condensation point: -196°C (-320.8°F)
Melting/freezing point: -210.01°C (-346°F)
Critical temperature: -146.95°C (-232.5°F)
Odor: Odorless.
Odor threshold: Not available.
pH: Not available.
Flash point: [Product does not sustain combustion.]
Burning time: Not applicable.
Burning rate: Not applicable.
Evaporation rate: Not available.
Flammability (solid, gas): Not available.
Lower and upper explosive (flammable) limits: Not available.
Vapor pressure: Not available.
Vapor density: 0.967 (Air = 1) Liquid Density@BP: 50.46 lb/ft3 (808.3 kg/m3)
Specific Volume (ft³/lb): 13.8889
Gas Density (lb/ft³): 0.072
Relative density: Not applicable.
Solubility: Not available.
Solubility in water: Not available.
Partition coefficient: n-octanol/water: 0.67
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.

Date of issue/Date of revision: 11/11/2014. Date of previous issue: 10/16/2014. Version: 0.05 5/11
Section 9. Physical and chemical properties

SADT : Not available.
Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity : Not available.

Irritation/Corrosion : Not available.

Sensitization : Not available.

Mutagenicity : Not available.

Carcinogenicity : Not available.

Reproductive toxicity : Not available.

Teratogenicity : Not available.

Specific target organ toxicity (single exposure) : Not available.

Specific target organ toxicity (repeated exposure) : Not available.

Aspiration hazard : Not available.
Section 11. Toxicological information

Information on the likely routes of exposure
Not available.

Potential acute health effects

**Eye contact**
Contact with rapidly expanding gas may cause burns or frostbite.

**Inhalation**
Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

**Skin contact**
Contact with rapidly expanding gas may cause burns or frostbite.

**Ingestion**
As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact**
No specific data.

**Inhalation**
No specific data.

**Skin contact**
No specific data.

**Ingestion**
No specific data.

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

**Short term exposure**

**Potential immediate effects**
Not available.

**Potential delayed effects**
Not available.

**Long term exposure**

**Potential immediate effects**
Not available.

**Potential delayed effects**
Not available.

Potential chronic health effects
Not available.

**General**
No known significant effects or critical hazards.

**Carcinogenicity**
No known significant effects or critical hazards.

**Mutagenicity**
No known significant effects or critical hazards.

**Teratogenicity**
No known significant effects or critical hazards.

**Developmental effects**
No known significant effects or critical hazards.

**Fertility effects**
No known significant effects or critical hazards.

Numerical measures of toxicity

**Acute toxicity estimates**
Not available.

Section 12. Ecological information

**Toxicity**
Not available.

**Persistence and degradability**
Not available.

Date of issue/Date of revision : 11/11/2014. Date of previous issue : 10/16/2014. Version : 0.05
# Section 12. Ecological information

## Bioaccumulative potential

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<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
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<tbody>
<tr>
<td>Nitrogen</td>
<td>0.67</td>
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<td>low</td>
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</table>

## Mobility in soil

**Soil/water partition coefficient (K<sub>OC</sub>)**

: Not available.

## Other adverse effects

: No known significant effects or critical hazards.

# Section 13. Disposal considerations

## Disposal methods

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

# Section 14. Transport information

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<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
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<td>Additional information</td>
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<td>Explosive Limit and Limited Quantity Index 0.125</td>
<td>Passenger Carrying Road or Rail Index 75</td>
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</table>

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

Date of issue/Date of revision: 11/11/2014. Date of previous issue: 10/16/2014. Version: 0.05 8/11
Section 14. Transport information

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.

Section 15. Regulatory information

U.S. Federal regulations: TSCA 8(a) CDR Exempt/Partial exemption: This material is listed or exempted.
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Not listed
Clean Air Act Section 602 Class I Substances: Not listed
Clean Air Act Section 602 Class II Substances: Not listed
DEA List I Chemicals (Precursor Chemicals): Not listed
DEA List II Chemicals (Essential Chemicals): Not listed

SARA 302/304
Composition/information on ingredients
No products were found.

SARA 304 RQ: Not applicable.

SARA 311/312
Classification: Sudden release of pressure

Composition/information on ingredients

<table>
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<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
</table>

State regulations

Massachusetts: This material is listed.
New York: This material is not listed.
New Jersey: This material is listed.
Pennsylvania: This material is listed.
Canada inventory: This material is listed or exempted.

International regulations

Date of issue/Date of revision: 11/11/2014. Date of previous issue: 10/16/2014. Version: 0.05.
Nitrogen

Section 15. Regulatory information

International lists:
- **Australia inventory (AICS):** This material is listed or exempted.
- **China inventory (IECSC):** This material is listed or exempted.
- **Japan inventory:** Not determined.
- **Korea inventory:** This material is listed or exempted.
- **Malaysia Inventory (EHS Register):** Not determined.
- **New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.
- **Philippines inventory (PICCS):** This material is listed or exempted.
- **Taiwan inventory (CSNN):** Not determined.

Chemical Weapons Convention List Schedule:
- **I Chemicals:** Not listed
- **II Chemicals:** Not listed
- **III Chemicals:** Not listed

Canada

**WHMIS (Canada):**
- **Class A: Compressed gas.**
- **CEPA Toxic substances:** This material is not listed.
- **Canadian ARET:** This material is not listed.
- **Canadian NPRI:** This material is not listed.
- **Alberta Designated Substances:** This material is not listed.
- **Ontario Designated Substances:** This material is not listed.
- **Quebec Designated Substances:** This material is not listed.

Section 16. Other information

**Canada Label requirements:**
- **Class A: Compressed gas.**

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

- **Health:** 0
- **Flammability:** 0
- **Physical hazards:** 0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

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

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

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

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

**Date of issue/Date of revision:** 11/11/2014
**Date of previous issue:** 10/16/2014
**Version:** 0.05

Powered by IHS
Section 16. Other information

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

History
Date of printing : 11/11/2014.
Date of issue/Date of revision : 11/11/2014.
Date of previous issue : 10/16/2014.
Version : 0.05

Key to abbreviations
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations
ACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References
Not available.

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

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

Section 1. Identification

GHS product identifier : Oxygen
Chemical name : oxygen
Other means of identification : Molecular oxygen; Oxygen molecule; Pure oxygen; O2; UN 1072; Dioxygen; Oxygen USP, Aviator’s Breathing Oxygen (ABO)
Product use : Synthetic/Analytical chemistry.
Synonym : Molecular oxygen; Oxygen molecule; Pure oxygen; O2; UN 1072; Dioxygen; Oxygen USP, Aviator’s Breathing Oxygen (ABO)
SDS # : 001043
Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-810-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

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

Classification of the substance or mixture : OXIDIZING GASES - Category 1
GASES UNDER PRESSURE - Compressed gas

GHS label elements
Hazard pictograms : 

Signal word : Danger
Hazard statements : May cause or intensify fire; oxidizer.
Contains gas under pressure; may explode if heated.

Precautionary statements
General : Read and follow all Safety Data Sheets (SDS’S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Open valve slowly. Use only with equipment cleaned for Oxygen service.

Prevention : Keep away from clothing, incompatible materials and combustible materials. Keep reduction valves, valves and fittings free from oil and grease.

Response : In case of fire: Stop leak if safe to do so.

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

Disposal : Not applicable.

Hazards not otherwise classified : None known.
Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : oxygen
Other means of identification : Molecular oxygen; Oxygen molecule; Pure oxygen; O2; UN 1072; Dioxygen; Oxygen USP, Aviator’s Breathing Oxygen (ABO)

CAS number/other identifiers
CAS number : 7782-44-7
Product code : 001043

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>oxygen</td>
<td>100</td>
<td>7782-44-7</td>
</tr>
</tbody>
</table>

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

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

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

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.
Section 4. First aid measures

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Contains gas under pressure. Oxidizing material. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products: No specific data.

Special protective actions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk.

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

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling
## Section 7. Handling and storage

### Protective measures

Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Keep away from clothing, incompatible materials and combustible materials. Keep reduction valves free from grease and oil. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

### Advice on general occupational hygiene

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

### Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Separate from acids, alkalies, reducing agents and combustibles. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

---

## Section 8. Exposure controls/personal protection

### Control parameters

#### Occupational exposure limits

| Oxygen | None. |

### Appropriate engineering controls

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

### Environmental exposure controls

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

### Individual protection measures

#### Hygiene measures

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

#### Eye/face protection

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

#### Skin protection

#### Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

#### Body protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Section 8. Exposure controls/personal protection

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

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

Section 9. Physical and chemical properties

Appearance

Physical state: Gas. [Compressed gas.]
Color: Colorless. Blue.
Molecular weight: 32 g/mole
Molecular formula: O2
Boiling/condensation point: -183°C (-297.4°F)
Melting/freezing point: -218.4°C (-361.1°F)
Critical temperature: -118.15°C (-180.7°F)
Odor: Odorless.
Odor threshold: Not available.
pH: Not available.
Flash point: [Product does not sustain combustion.]
Burning time: Not applicable.
Burning rate: Not applicable.
Evaporation rate: Not available.
Flammability (solid, gas): Extremely flammable in the presence of the following materials or conditions: reducing materials, combustible materials and organic materials.

Lower and upper explosive (flammable) limits: Not available.
Vapor pressure: Not available.
Vapor density: 1.1 (Air = 1)
Specific Volume (ft³/lb): 12.0482
Gas Density (lb/ft³): 0.083
Relative density: Not applicable.
Solubility: Not available.
Solubility in water: Not available.
Partition coefficient: n-octanol/water: 0.65
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.
SADT: Not available.
Viscosity: Not available.

Section 10. Stability and reactivity

Reactivity: No specific test data related to reactivity available for this product or its ingredients.

Chemical stability: The product is stable.
Section 10. Stability and reactivity

Possibility of hazardous reactions : Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include the following:
contact with combustible materials
Reactions may include the following:
risk of causing fire

Conditions to avoid : No specific data.

Incompatible materials : Highly reactive or incompatible with the following materials:
combustible materials
reducing materials
grease
oil

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity
Not available.

Irritation/Corrosion
Not available.

Sensitization
Not available.

Mutagenicity
Not available.

Carcinogenicity
Not available.

Reproductive toxicity
Not available.

Teratogenicity
Not available.

Specific target organ toxicity (single exposure)
Not available.

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.
Section 11. Toxicological information

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics
Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

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

Short term exposure
Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure
Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects
Not available.

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

Numerical measures of toxicity

Acute toxicity estimates
Not available.

Section 12. Ecological information

Toxicity
Not available.

Persistence and degradability
Not available.

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP\text{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>oxygen</td>
<td>0.65</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

Mobility in soil

Soil/water partition coefficient (K\text{OC}) : Not available.
Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

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

Section 14. Transport information

<table>
<thead>
<tr>
<th>UN number</th>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>OXYGEN, COMPRESSED</td>
<td>OXYGEN, COMPRESSED</td>
<td>OXYGEN, COMPRESSED</td>
<td>OXYGEN, COMPRESSED</td>
<td>OXYGEN, COMPRESSED</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>2.2 (5.1)</td>
<td>2.2</td>
<td>2.2 (5.1)</td>
<td>2.2 (5.1)</td>
<td>2.2 (5.1)</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Additional information</td>
<td>Limited quantity Yes.</td>
<td>Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.23-2.25 (Class 5).</td>
<td>-</td>
<td>-</td>
<td>Passenger and Cargo Aircraft Quantity limitation: 75 kg Cargo Aircraft Only Quantity limitation: 150 kg</td>
</tr>
<tr>
<td>Packaging instruction</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Passenger aircraft</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quantity limitation: 75 kg</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>Cargo aircraft</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quantity limitation: 150 kg</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Special provisions A52</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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

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

Date of issue/Date of revision : 8/26/2015  Date of previous issue : No previous validation  Version : 0.01 8/11
Section 14. Transport information

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.

Section 15. Regulatory information

U.S. Federal regulations

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Not listed
Clean Air Act Section 602 Class I Substances: Not listed
Clean Air Act Section 602 Class II Substances: Not listed
DEA List I Chemicals (Precursor Chemicals): Not listed
DEA List II Chemicals (Essential Chemicals): Not listed

SARA 302/304
Composition/information on ingredients
No products were found.

SARA 304 RQ: Not applicable.

SARA 311/312
Classification: Sudden release of pressure

Composition/information on ingredients

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

State regulations

Massachusetts: This material is listed.
New York: This material is not listed.
New Jersey: This material is listed.
Pennsylvania: This material is listed.

International regulations

International lists

National inventory

Australia: This material is listed or exempted.
Canada: This material is listed or exempted.
China: This material is listed or exempted.
Europe: This material is listed or exempted.
Japan: Not determined.
Malaysia: Not determined.
New Zealand: This material is listed or exempted.
Philippines: This material is listed or exempted.
Republic of Korea: This material is listed or exempted.
Taiwan: This material is listed or exempted.
Section 15. Regulatory information

Canada

WHMIS (Canada)

- Class A: Compressed gas.
- Class C: Oxidizing material.

**CEPA Toxic substances**: This material is not listed.

**Canadian ARET**: This material is not listed.

**Canadian NPRI**: This material is not listed.

**Alberta Designated Substances**: This material is not listed.

**Ontario Designated Substances**: This material is not listed.

**Quebec Designated Substances**: This material is not listed.

Section 16. Other information

Canada Label requirements

- Class A: Compressed gas.
- Class C: Oxidizing material.

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

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

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

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

**Procedure used to derive the classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ox. Gas 1, H270 Press. Gas Comp. Gas, H280</td>
<td>Expert judgment According to package</td>
</tr>
</tbody>
</table>

**History**

- **Date of printing**: 8/26/2015
- **Date of issue/Date of revision**: 8/26/2015
- **Date of previous issue**: No previous validation
- **Version**: 0.01
Section 16. Other information

Key to abbreviations

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

References

Not available.

Indicates information that has changed from previously issued version.

Notice to reader

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

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
SECTION: 1. Product and company identification

1.1. Product identifier

Product form: Substance
Name: Propane
CAS No: 74-98-6
Formula: C3H8
Other means of identification: Propane, Liquefied Petroleum Gas, n-propane, dimethylmethane, propyl hydride, refrigerant gas R290

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture: Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number: Onsite Emergency: 1-800-645-4633
CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification
Flam. Gas 1 H220
Liquefied gas H280

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US):

- GHS02
- GHS04

Signal word (GHS-US): DANGER

Hazard statements (GHS-US):
- H220 - EXTREMELY FLAMMABLE GAS
- H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
- OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
- CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
- CGA-HG01 - MAY CAUSE FROSTBITE

Precautionary statements (GHS-US):
- P202 - Do not handle until all safety precautions have been read and understood
- P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
- P271+P403 - Use and store only outdoors or in a well-ventilated place
- P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
- P381 - Eliminate all ignition sources if safe to do so
- CGA-PG05 - Use a back flow preventive device in the piping
- CGA-PG12 - Do not open valve until connected to equipment prepared for use
- CGA-PG06 - Close valve after each use and when empty
- CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles
- CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

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2.3. Other hazards

Other hazards not contributing to the classification:

Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane (Main constituent)</td>
<td>(CAS No) 74-96-6</td>
<td>100</td>
</tr>
</tbody>
</table>

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact:
The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact:
Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.

First-aid measures after ingestion:
Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Carbon dioxide, dry chemical powder, water spray, fog.

5.2. Special hazards arising from the substance or mixture

Fire hazard:
EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard:
EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Reactivity:
No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions:
Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting:
Compressed gas: asphyxiating. Suffocation hazard by lack of oxygen.
Special protective equipment for fire fighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Specific methods: Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Stop flow of product if safe to do so

Use water spray or fog to knock down fire fumes if possible.

Other information: Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Evacuate area. Ensure adequate air ventilation. Stop leak if safe to do so.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinders, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.
7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store only where temperature will not exceed 125°F (52°C). Post “No Smoking or Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Propane (74-98-6)</th>
<th>USA OSHA OSHA PEL (TWA) (mg/m³)</th>
<th>1800 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USA OSHA OSHA PEL (TWA) (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>USA IDLH US IDLH (mg/m³)</td>
<td>&lt; mg/m³</td>
</tr>
<tr>
<td></td>
<td>USA IDLH US IDLH (ppm)</td>
<td>2100 ppm (10% LEL)</td>
</tr>
<tr>
<td>ACGIH</td>
<td>Not established</td>
<td></td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: An explosion-proof local exhaust system or a mechanical system is acceptable if it can prevent oxygen deficiency and keep hazardous fumes and gases below all applicable exposure limits in the worker’s breathing area. During welding, ensure that there is adequate ventilation to keep worker exposure below applicable limits for fumes, gases, and other by-products of welding. Do not breathe fumes or gases. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes, or may cause other similar discomfort.

Eye protection: Wear safety glasses with side shields.

Skin and body protection: As needed for welding, wear hand, head, and body protection to help prevent injury from radiation and sparks. (See ANSI Z49.1.) At a minimum, this includes welder’s gloves and protective goggles, and may include arm protectors, aprons, hats, and shoulder protection as well as substantial clothing.

Respiratory protection: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection: Wear cold insulating gloves when transferring or breaking transfer connections.

Environmental exposure controls: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Other information: Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling containers.
# SECTION 9: Physical and chemical properties

## 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless gas.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>44 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless.</td>
</tr>
<tr>
<td>Odor</td>
<td>Poor warning properties at low concentrations. Stenchant often added. Sweetish.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (ether=1)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>-187.69 °C (-305.8°F)</td>
</tr>
<tr>
<td>Boiling point</td>
<td>-42.1 °C (-44.32°F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>-104.4 °C (-155.2°F) TCC</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>96.8 °C (206°F)</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>450 °C (842°F)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>2.1 - 9.5 vol %</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>8.58 bar (109.73 psig)</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.58</td>
</tr>
<tr>
<td>Density</td>
<td>0.506 - 0.583 g/cm³ (at 15 °C)</td>
</tr>
<tr>
<td>Relative gas density</td>
<td>1.5</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: 75 mg/l</td>
</tr>
<tr>
<td>Log Pow</td>
<td>2.36</td>
</tr>
<tr>
<td>Log Kow</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>None.</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

## 9.2. Other information

- **Gas group**: Liquefied gas
- **Additional information**: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

# SECTION 10: Stability and reactivity

## 10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

## 10.2. Chemical stability

Stable under normal conditions.

## 10.3. Possibility of hazardous reactions

Can form explosive mixture with air. May react violently with oxidants.

## 10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

## 10.5. Incompatible materials

10.6. Hazardous decomposition products

Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. The welding and cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Propane (If I)74-98-6

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 inhalation rat (mg/l)</td>
<td>658 mg/l/4h</td>
</tr>
<tr>
<td>ATE US (vapors)</td>
<td>658.000 mg/l/4h</td>
</tr>
<tr>
<td>ATE US (dust, mist)</td>
<td>658.000 mg/l/4h</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation

: Not classified

pH: Not applicable.

Serious eye damage/irritation

: Not classified

pH: Not applicable.

Respiratory or skin sensitization

: Not classified

Germ cell mutagenicity

: Not classified

Carcinogenicity

: Not classified

Reproductive toxicity

: Not classified

Specific target organ toxicity (single exposure)

: Not classified

Specific target organ toxicity (repeated exposure)

: Not classified

Aspiration hazard

: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general

: No ecological damage caused by this product.

12.2. Persistence and degradability

Propane (74-98-6)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
<td>The substance is biodegradable. Unlikely to persist.</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

Propane (74-98-6)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
<td>2.36</td>
</tr>
<tr>
<td>Log Kow</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
<td>Not expected to bioaccumulate due to the low log Kow (log Kow &lt; 4). Refer to section 9.</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

Propane (74-98-6)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility in soil</td>
<td>No data available.</td>
</tr>
<tr>
<td>Ecology - soil</td>
<td>Because of its high volatility, the product is unlikely to cause ground or water pollution.</td>
</tr>
</tbody>
</table>

12.5. Other adverse effects

Effect on ozone layer

: None

Effect on the global warming

: No known effects from this product
SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations: Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

In accordance with DOT

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport document description</td>
<td>UN1978 Propane (see also Petroleum gases, liquefied [UN1075]), 2.1</td>
</tr>
<tr>
<td>UN-No.(DOT)</td>
<td>UN1978</td>
</tr>
<tr>
<td>Proper Shipping Name (DOT)</td>
<td>Propane</td>
</tr>
<tr>
<td>Class (DOT)</td>
<td>2.1 - Class 2.1 - Flammable gas 49 CFR 173.115</td>
</tr>
<tr>
<td>Hazard labels (DOT)</td>
<td>2.1 - Flammable gas</td>
</tr>
</tbody>
</table>

DOT Special Provisions (49 CFR 172.102): 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information.

T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.

Additional information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Response Guide (ERG) Number</td>
<td>115 (UN1075)</td>
</tr>
<tr>
<td>Other information</td>
<td>No supplementary information available.</td>
</tr>
<tr>
<td>Special transport precautions</td>
<td>Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.</td>
</tr>
</tbody>
</table>

Transport by sea

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-No. (IMDG)</td>
<td>1978</td>
</tr>
<tr>
<td>Proper Shipping Name (IMDG)</td>
<td>PROPAINE</td>
</tr>
<tr>
<td>Class (IMDG)</td>
<td>2 - Gases</td>
</tr>
<tr>
<td>MFAG-No</td>
<td>115</td>
</tr>
</tbody>
</table>

Air transport

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-No. (IATA)</td>
<td>1978</td>
</tr>
<tr>
<td>Proper Shipping Name (IATA)</td>
<td>PROPAINE</td>
</tr>
<tr>
<td>Class (IATA)</td>
<td>2</td>
</tr>
<tr>
<td>Civil Aeronautics Law</td>
<td>Gases under pressure/Gases flammable under pressure</td>
</tr>
</tbody>
</table>

SECTION 15: Regulatory information

15.1. US Federal regulations

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane (74-98-6)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
<tr>
<td>SARA Section 311/312 Hazard Classes</td>
<td>Immediate (acute) health hazard</td>
</tr>
<tr>
<td></td>
<td>Sudden release of pressure hazard</td>
</tr>
<tr>
<td></td>
<td>Fire hazard</td>
</tr>
</tbody>
</table>

EN (English US) SDS ID: P-4646
# Propane Safety Data Sheet P-4646

**Date of issue:** 01/01/1984  
**Revision date:** 01/21/2016  
**Supersedes:** 04/08/2015

## Propane (74-98-6)

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

### 15.2. International regulations

#### CANADA

| Propane (74-98-6) |  
|---|---|
| Listed on the Canadian DSL (Domestic Substances List) |  

#### EU-Regulations

| Propane (74-98-6) |  
|---|---|
| Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) |  

### 15.2.2. National regulations

| Propane (74-98-6) |  
|---|---|
| Listed on the AICS (Australian Inventory of Chemical Substances) |  
| Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) |  
| Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory |  
| Listed on the Korean ECL (Existing Chemicals List) |  
| Listed on NZIoC (New Zealand Inventory of Chemicals) |  
| Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) |  
| Listed on INSQ (Mexican national Inventory of Chemical Substances) |  
| Listed on CICR (Turkish Inventory and Control of Chemicals) |  

### 15.3. US State regulations

#### Propane (74-98-6)

<table>
<thead>
<tr>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
<td>No</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
<td>No</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
<td>No</td>
</tr>
<tr>
<td>State or local regulations</td>
<td></td>
</tr>
<tr>
<td>U.S. - Massachusetts - Right To Know List</td>
<td></td>
</tr>
<tr>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
<td></td>
</tr>
<tr>
<td>U.S. - Pennsylvania - RTK (Right to Know) List</td>
<td></td>
</tr>
</tbody>
</table>

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm.
SECTION 16: Other information


Fumes and gases produced during welding and cutting processes can be dangerous to your health and may cause serious lung disease. KEEP YOUR HEAD OUT OF FUMES. DO NOT BREATHE FUMES AND GASES. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes; or may cause other similar discomfort. Contaminants in the air may add to the hazard of fumes and gases.

When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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NFPA health hazard: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
<table>
<thead>
<tr>
<th>HMIS III Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>1 Slight Hazard - Irritation or minor reversible injury possible</td>
</tr>
<tr>
<td>Flammability</td>
<td>4 Severe Hazard</td>
</tr>
<tr>
<td>Physical</td>
<td>2 Moderate Hazard</td>
</tr>
</tbody>
</table>

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.
Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name: Shell Omala S2 G 320
Uses: Gear lubricant.
Product Code: 001D7838

Manufacturer/Supplier: Shell Canada Products
400 - 4th Avenue S.W
Calgary AB T2P 0J4
Canada

Telephone: (+1) 8006611600
Fax: (+1) 4033848345

Emergency Telephone Number:
CHEMTREC (24 hr): (+1) 800-424-9300
CANUTEC (24 hr): (+1) 613-996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description: Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Refer to Chapter 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

WHMIS Class/Description: THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.
Routes of Exposure: Skin and eye contact are the primary routes of exposure although exposure may occur following accidental ingestion.
Health Hazards: Not expected to be a health hazard when used under normal conditions. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. Used oil may contain harmful impurities.
Signs and Symptoms: Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
Safety Hazards: Not classified as flammable but will burn.
Environmental Hazards: Not classified as dangerous for the environment.

4. FIRST AID MEASURES

General Information: Not expected to be a health hazard when used under normal conditions.
Material Safety Data Sheet

Inhalation: No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.

Skin Contact: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

Eye Contact: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion: In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

Advice to Physician: Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point: Typical 255 °C / 491 °F (COC)
Upper / lower Flammability or Explosion limits: Typical 1 - 10 % (V)(based on mineral oil)
Auto ignition temperature: > 320 °C / 608 °F
Hazardous Combustion Products and Specific Hazards: Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Suitable Extinguishing Media: Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media: Do not use water in a jet.
Protective Equipment for Firefighters: Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Protective Measures: Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Clean Up Methods: Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice: Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions: Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage.
Material Safety Data Sheet

Handling: Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.

Storage: Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.

Product Transfer: This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.

Recommended Materials: For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials: PVC.

Additional Information: Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Material Source</th>
<th>Material Source</th>
<th>Type</th>
<th>ppm</th>
<th>mg/m3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil mist, mineral</td>
<td>ACGIH</td>
<td>TWA(inhalable fraction.)</td>
<td>5 mg/m3</td>
<td></td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits within their jurisdiction.

Biological Exposure Index (BEI)

No biological limit allocated.

Exposure Controls: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment,
local exhaust ventilation. Drain down system prior to equipment
break-in or maintenance. Retain drain downs in sealed storage
pending disposal or for subsequent recycle. Always observe
good personal hygiene measures, such as washing hands after
handling the material and before eating, drinking, and/or
smoking. Routinely wash work clothing and protective
equipment to remove contaminants. Discard contaminated
clothing and footwear that cannot be cleaned. Practice good
housekeeping.

Personal Protective Equipment

Respiratory Protection: Personal protective equipment (PPE) should meet
recommended national standards. Check with PPE suppliers.

No respiratory protection is ordinarily required under normal
conditions of use. In accordance with good industrial hygiene
practices, precautions should be taken to avoid breathing of
material. If engineering controls do not maintain airborne
centrations to a level which is adequate to protect worker
health, select respiratory protection equipment suitable for the
specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers. Where
air-filtering respirators are suitable, select an appropriate
combination of mask and filter. Select a filter suitable for
combined particulate/organic gases and vapours [boiling point
>65°C(149 °F)].

Hand Protection: Where hand contact with the product may occur the use of
gloves approved to relevant standards (e.g. Europe: EN374,
US: F739) made from the following materials may provide
suitable chemical protection: PVC, neoprene or nitrile rubber
gloves. Suitability and durability of a glove is dependent on
usage, e.g. frequency and duration of contact, chemical
resistance of glove material, dexterity. Always seek advice
from glove suppliers. Contaminated gloves should be replaced.
Personal hygiene is a key element of effective hand care.
Gloves must only be worn on clean hands. After using gloves,
hands should be washed and dried thoroughly. Application of a
non-perfumed moisturizer is recommended. For continuous
contact we recommend gloves with breakthrough time of more
than 240 minutes with preference for > 480 minutes where
suitable gloves can be identified. For short-term/splash
protection we recommend the same, but recognise that
suitable gloves offering this level of protection may not be
available and in this case a lower breakthrough time may be
acceptable so long as appropriate maintenance and
replacement regimes are followed. Glove thickness is not a
good predictor of glove resistance to a chemical as it is
dependent on the exact composition of the glove material.

Eye Protection: Wear safety glasses or full face shield if splashes are likely to
occur.

Protective Clothing: Skin protection not ordinarily required beyond standard issue
work clothes.

Monitoring Methods: Monitoring of the concentration of substances in the breathing
zone of workers or in the general workplace may be required to
Material Safety Data Sheet

confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. http://www.dguv.de/inhalt/index.jsp
L’Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Environmental Exposure Controls

Take appropriate measures to fulfil the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Brown. Liquid at room temperature.</td>
</tr>
<tr>
<td>Odour</td>
<td>Slight hydrocarbon.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Data not available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Initial Boiling Point and Boiling Range</td>
<td>&gt; 280 °C / 536 °F estimated value(s)</td>
</tr>
<tr>
<td>Pour point</td>
<td>Typical -15 °C / 5 °F</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>&lt; 0.5 Pa at 20 °C / 68 °F (estimated value(s))</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>Typical 0.903 at 15 °C / 59 °F</td>
</tr>
<tr>
<td>Density</td>
<td>Typical 903 kg/m3 at 15 °C / 59 °F</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Negligible.</td>
</tr>
<tr>
<td>n-octanol/water partition coefficient (log Pow)</td>
<td>&gt; 6 (based on information on similar products)</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>Typical 320 mm2/s at 40 °C / 104 °F</td>
</tr>
<tr>
<td>Vapour density (air=1)</td>
<td>&gt; 1 (estimated value(s))</td>
</tr>
<tr>
<td>Electrical conductivity</td>
<td>This material is not expected to be a static accumulator.</td>
</tr>
</tbody>
</table>
Material Safety Data Sheet

Evaporation rate (nBuAc=1) : Data not available

10. STABILITY AND REACTIVITY

Stability : Stable.
Conditions to Avoid : Extremes of temperature and direct sunlight.
Materials to Avoid : Strong oxidising agents.
Hazardous : Hazardous decomposition products are not expected to form during normal storage.
Decomposition Products : No
Hazardous : No
Polymerisation : No
Sensitivity to Mechanical Impact : No
Sensitivity to Static Discharge : No

11. TOXICOLOGICAL INFORMATION

Basis for Assessment : Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Routes of Exposure : Skin and eye contact are the primary routes of exposure although exposure may occur following accidental ingestion.
Acute Oral Toxicity : Expected to be of low toxicity: LD50 > 5000 mg/kg, Rat.
Acute Dermal Toxicity : Expected to be of low toxicity: LD50 > 5000 mg/kg, Rabbit.
Acute Inhalation Toxicity : Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation : Expected to be slightly irritating.
Eye Irritation : Expected to be slightly irritating.
Respiratory Irritation : Inhalation of vapours or mists may cause irritation.
Sensitisation : Not expected to be a skin sensitiser.
Repeated Dose Toxicity : Not expected to be a hazard.
Mutagenicity : Not considered a mutagenic hazard.
Carcinogenicity : Not expected to be carcinogenic. Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Material | Carcinogenicity Classification
--- | ---
Highly refined mineral oil (IP346 <3%) | ACGIH Group A4: Not classifiable as a human carcinogen.
Highly refined mineral oil (IP346 <3%) | IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%) | GHS / CLP: No carcinogenicity classification

Reproductive and : Not expected to be a hazard.
Material Safety Data Sheet

Developmental Toxicity Additional Information: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract. Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility: Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.

Persistence/degradability: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation: Contains components with the potential to bioaccumulate.

Other Adverse Effects: Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.

Container Disposal: Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.
14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification

This product is not regulated under the Canadian Transportation of Dangerous Goods Regulations for transport by road and rail.

Additional Information MARPOL Annex 1 rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Class/Description : THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

Inventory Status

EINECS : All components listed or polymer exempt.
TSCA : All components listed.
DSL : All components listed.

16. OTHER INFORMATION

SDS Version Number : 1.2
SDS Effective Date : 07-12-2013
SDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.
SDS Regulation : The content and format of this (M)SDS is in accordance with the Controlled Product Regulations.
SDS Prepared By : Shell Product Stewardship; 1-800-661-1600
SDS Distribution : The information in this document should be made available to all who may handle the product.

Disclaimer : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to
Material Safety Data Sheet

According to the Controlled Product Regulations be obtained from the use of the product.
1. Identification

Product Name: Silicon, Powder, -60 Mesh, 99.999%
Cat No.: AC225510050
CAS-No: 7440-21-3
Synonyms: No information available

Recommended Use: Laboratory chemicals.
Uses advised against: Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet:

Company:
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (703) 527-3887

Emergency Telephone Number
For information US call: 001-800-ACROS-01 / Europe call: +32 14 57 52 11
Emergency Number US:001-201-796-7100 / Europe: +32 14 57 52 99
CHEMTREC Tel. No.US:001-800-424-9300 / Europe:001-703-527-3887

2. Hazard(s) identification

Classification:
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| Flammable solids | Category 2 |

Label Elements

Signal Word: Warning

Hazard Statements:
Flammable solid

Precautionary Statements
Prevention
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Wear protective gloves/protective clothing/eye protection/face protection

**Fire**
In case of fire: Use CO2, dry chemical, or foam for extinction

**Hazards not otherwise classified (HNOC)**
None identified

### 3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>7440-21-3</td>
<td>&gt; 99</td>
</tr>
</tbody>
</table>

### 4. First-aid measures

**General Advice**
If symptoms persist, call a physician.

**Eye Contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact**
Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation**
Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

**Ingestion**
Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

**Most important symptoms and effects**
None reasonably foreseeable.

**Notes to Physician**
Treat symptomatically

### 5. Fire-fighting measures

**Unsuitable Extinguishing Media**
No information available

**Flash Point**
Not applicable

**Method -**
No information available

**Autoignition Temperature**
Not applicable 150 °C / 302 °F

**Explosion Limits**

- **Upper**
  No data available

- **Lower**
  No data available

**Sensitivity to Mechanical Impact**
No information available

**Sensitivity to Static Discharge**
No information available

**Specific Hazards Arising from the Chemical**
Keep product and empty container away from heat and sources of ignition.

**Hazardous Combustion Products**
None known

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Silicon, Powder, -60 Mesh, 99.999%

6. Accidental release measures

Personal Precautions
Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.

Environmental Precautions
Should not be released into the environment.

Methods for Containment and Clean Up
Sweep up or vacuum up spillage and collect in suitable container for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling
Wear personal protective equipment. Ensure adequate ventilation. Avoid ingestion and inhalation. Avoid dust formation. Do not get in eyes, on skin, or on clothing.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
<th>Mexico OEL (TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>(Vacated) TWA: 10 mg/m³ (Vacated) TWA: 5 mg/m³ TWA: 15 mg/m³ TWA: 5 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 10 mg/m³ STEL: 20 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Legend
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures
None under normal use conditions.

Personal Protective Equipment

Eye/face Protection
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection
Long sleeved clothing.

Respiratory Protection
No protective equipment is needed under normal use conditions.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Powder Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>1410 °C / 2570 °F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>2355 °C / 4271 °F @ 760 mmHg</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid,gas)</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability or explosive limits</td>
<td></td>
</tr>
</tbody>
</table>
10. Stability and reactivity

Reactive Hazard
None known, based on information available

Stability
Stable under normal conditions.

Conditions to Avoid

Incompatible Materials
Strong oxidizing agents

Hazardous Decomposition Products
None under normal use conditions

Hazardous Polymerization
Hazardous polymerization does not occur.

11. Toxicological information

Acute Toxicity

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>LD50 = 3160 mg/kg (Rat)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products
No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation
No information available

Sensitization
No information available

Carcinogenicity
The table below indicates whether each agency has listed any ingredient as a carcinogen.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>7440-21-3</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Mutagenic Effects
No information available

Reproductive Effects
No information available.

Developmental Effects
No information available.

Teratogenicity
No information available.

STOT - single exposure
None known

STOT - repeated exposure
None known
Aspiration hazard  No information available
Symptoms / effects, both acute and delayed  No information available
Endocrine Disruptor Information  No information available
Other Adverse Effects  The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity  Do not empty into drains.
Persistence and Degradability  Insoluble in water
Bioaccumulation / Accumulation  No information available.
Mobility  Is not likely mobile in the environment due to its low water solubility.

13. Disposal considerations

Waste Disposal Methods  Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- UN-No  UN1346
- Proper Shipping Name  SILICON POWDER, AMORPHOUS
- Hazard Class  4.1
- Packing Group  III

TDG
- UN-No  UN1346
- Proper Shipping Name  SILICON POWDER, AMORPHOUS
- Hazard Class  4.1
- Packing Group  III

IATA
- UN-No  UN1346
- Proper Shipping Name  SILICON POWDER, AMORPHOUS
- Hazard Class  4.1
- Packing Group  III

IMDG/IMO
- UN-No  UN1346
- Proper Shipping Name  SILICON POWDER, AMORPHOUS
- Hazard Class  4.1
- Packing Group  III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NSDL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IECS</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-130-8</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated
polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable
SARA 313 Not applicable
SARA 311/312 Hazard Categories See section 2 for more information
CWA (Clean Water Act) Not applicable
Clean Air Act Not applicable
OSHA Occupational Safety and Health Administration
Not applicable
CERCLA Not applicable
California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 23-Jun-2008
Revision Date 19-Jan-2018
Print Date 19-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the
date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage,
transportation, disposal and release and is not to be considered a warranty or quality specification. The information
relates only to the specific material designated and may not be valid for such material used in combination with any other
materials or in any process, unless specified in the text.

End of SDS
Section 1 - Product and Company Identification

Product Name: Sodium Bisulfite
Chemical Formula: NaHSO₃
CAS Number: 007631-90-5
Other Designations: Sodium Bisulfite Solution, Sodium Hydrogen Sulfite Solution.
General Use: Food and pharmaceutical preservative, waste water dechlorination agent, laboratory reagent, reducing agent, dietary supplement, and color preservative.

Manufacturer: Calabrian Corporation
5500 Hwy. 366
Port Neches, Texas77651

Telephone: 409-727-1471
Fax: 409-727-5803
Emergency Contact: CHEMTREC 800-424-9300

Section 2 - Hazards Identification

Emergency Overview
Target Organs: Respiratory system, eyes, skin
GHS Classification: Acute Toxicity, Oral (Category 4)
Acute Toxicity, Dermal (Category 5)
Serious Eye Irritant (Category 2A)

GHS Label Elements: Signal Word – Warning

Hazard Statements: H302 – Harmful if swallowed
H313 – May be harmful to skin
H319 – Causes serious eye irritation

Precautionary Statements: P280 – Wear protective equipment for hands, eyes, face and respiratory tract
P305, P351 and P338 – IF IN EYES: Rinse with water for several minutes.
Remove contact lenses if present and continue rinsing.

Other Hazards: Contact with acids liberates toxic sulfur dioxide gas.

HMIS Classification: Health Hazard 2
Flammability 0
Physical 0
SODIUM BISULFITE

NFPA Rating:

- Health Hazard: 2
- Fire: 0
- Reactivity: 0

Potential Health Effects:

- Inhalation: Irritant to respiratory tract
- Eye: Irritant
- Skin: Irritant
- Ingestion: Harmful if swallowed
- Aggravated Medical Condition: Capable of provoking bronchospasm in sulfite sensitive individuals with asthma.

Section 3 - Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Composition</th>
<th>CAS Number</th>
<th>% Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>-</td>
<td>50 – 70</td>
</tr>
<tr>
<td>Sodium bisulfite</td>
<td>007631-90-5</td>
<td>30 – 50</td>
</tr>
<tr>
<td>Sodium Sulfite</td>
<td>007757-83-7</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Sodium Sulfate</td>
<td>007757-82-6</td>
<td>&lt; 3.5</td>
</tr>
</tbody>
</table>

Section 4 - First Aid Measures

<table>
<thead>
<tr>
<th>Exposure Route</th>
<th>Symptom</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation:</td>
<td>Sore throat, shortness of breath coughing,</td>
<td>Remove from exposure to fresh air. Seek medical attention in severe cases or if recovery is</td>
</tr>
<tr>
<td></td>
<td>and congestion.</td>
<td>not rapid.</td>
</tr>
<tr>
<td>Eye Contact:</td>
<td>Irritation to eyes and mucous membranes.</td>
<td>Irrigate with water until no evidence of chemical remains. Obtain medical attention.</td>
</tr>
<tr>
<td>Skin Contact:</td>
<td>Irritation, itching, dermatitis</td>
<td>Wash with soap and drench with water. Remove contaminated clothing and wash before reuse.</td>
</tr>
<tr>
<td>Ingestion:</td>
<td>Irritation to mucous membranes.</td>
<td>Give large quantities of water or milk immediately. Obtain medical attention.</td>
</tr>
</tbody>
</table>

Seek appropriate medical attention and provide this SDS to attending doctor

Note to physician: Exposure may aggravate acute or chronic asthma, emphysema and bronchitis.

Section 5 - Fire-Fighting Measures

- Flash Point: Not combustible.
- Flash Point Method: Not Applicable.
- Burning Rate: Not Applicable.
- Auto Ignition Temperature: Not Applicable.
- LEL: Not Applicable.
- UEL: Not Applicable.
- Flammability Classification: Not Flammable.
- Extinguishing Media: Use extinguishing agent appropriate for surrounding fire conditions.
- Unusual Fire or Explosion Hazards: None indicated.
- Hazardous Combustion Product: May release hazardous gas.
- Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or
Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full face piece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Spill / Leak Procedures: Wear appropriate PPE - See Section 8.
Small Spills / Leaks: Spills can be neutralized with an alkaline material such as caustic soda. Leaks may be located by spraying the area with ammonium hydroxide solution which forms a white fume in the presence of sulfur dioxide.
Large Spills / Leaks: Large spills should be handled according to a predetermined plan.
Containment: For large spills, dike far ahead of contaminated runoff for later disposal.

Section 7 - Handling and Storage

Handling Precautions: Avoid contact with product. Do not breathe dust or vapor.
Storage Requirements: Store in areas, away from heat and moisture and protect from physical damage. Segregate from acids and oxidizers.

Section 8 - Exposure Controls / Personal Protection:

Component: Sodium Bisulfite 
CAS Number: 007631-90-5

ACGIH (TLV) TWA: 5 mg/m³
OSHA (PEL) TWA: 5 mg/m³
NIOSH (REL) TWA: 5 mg/m³

IDLH – None established

IDLH - Immediately Dangerous to Life or Health
PEL – Permissible Exposure Limit
REL – Recommended Exposure Limit
TLV – Threshold Limit Value
ACGIH – American Conference of Governmental Industrial Hygienists
TWA – Time Weighted Average based on 8 hour exposure days and a 40 hour week.

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA limits (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at the source.

Respiratory Protection: Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear a SCBA. Warning! Air-
purifying respirators do not protect workers in oxygen-deficient atmospheres.

Protective Clothing / Equipment: Wear protective gloves, boots, and clothing when necessary to prevent excessive skin contact. Wear protective eyeglasses or goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Safety Stations: Make emergency eyewash stations, showers, and washing facilities available in the work area.

Contaminated Equipment: Remove this material from personal protective equipment as needed. Do not eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before food or beverage consumption.

Section 9 - Physical and Chemical Properties

| Physical State: | Liquid | Water Solubility: | NA |
| Appearance: | Yellow | Other Solubility: | NA |
| Odor Threshold: | Pungent SO₂ odor | Boiling Point: | 205 °F |
| Vapor Pressure: | NA | Freezing Point: | 26 °F |
| Vapor Density (Air=1): | NA | Melting Point: | |
| Formula Weight: | 104 | Evaporation Rate: | Normal |
| Density: | NA | pH: | 2.9 – 4.9 |
| Specific Gravity (H₂O=1): | 1.3 - 1.4 | % Volatile: | NA |

Section 10 - Stability & Reactivity

Stability: Stable under normal conditions.

Polymerization: Hazardous polymerization will not occur.

Chemical Incompatibilities: Sodium Bisulfite Solutions may release toxic and hazardous fumes of sulfur oxides, including sulfur dioxide. Acute poisoning from sulfur dioxide is rare because the gas is easily detected. It is so irritating that contact cannot be tolerated. Symptoms include coughing, hoarseness, sneezing, tearing, and breathing difficulty. However, workers who cannot escape high accidental exposure may suffer severe pulmonary damage which can be fatal. Contact with powdered potassium, sodium metals, alkali, and oxidizing agents produce violent reactions. Reacts with water and steam to form corrosive sulfuric acid. Reacts with chlorates to form unstable chlorine dioxide.

Conditions to Avoid: Avoid excessive heat, or open flame.

Hazardous Decomposition Products: May release hazardous sulfur dioxide gas.

Section 11 - Toxicological Information

Skin Effects (rabbit): Not available. Acute Oral Effects (rat): LD₅₀ = 2,000 mg/kg
Carcinogenicity: IARC, NTP, and OSHA do not list Sodium Bisulfite as a carcinogen.
Chronic Effects: Prolonged or repeated exposure may cause dermatitis, and sensitization
reactions. Exposure to asthmatic, atopic and sulfite sensitive individuals may result in severe bronchioconstriction and reduced levels in forced expiratory volume. Decomposition of sodium bisulfite solutions may release toxic and hazardous fumes of sulfur oxides, including sulfur dioxide, which may cause permanent pulmonary impairments from acute and chronic exposure. The Immediately Dangerous to Life or Health (IDLH) level for SO₂ is 100 ppm.

Aquatic Toxicity: The toxicity threshold of Sodium Bisulfite (100 hr. at 23 degrees Celsius) to Daphnia Magna has been reported to be 102 mg/l. In the presence of additional sodium salts, this threshold may be lower. For minnows, exposed for 6 hours to sodium bisulfite solution in distilled water at 19 degrees Celsius it was 60-65 mg/l, and in hard water at 18 degrees Celsius it was 80-85 mg/l.

The 24, 48, and 96 hour LC50 value was 240 mg/l for the mosquito-fish (Gambusia affinis) in turbid water at 17 - 22 degree Celsius.

Section 12 - Ecological Information

Ecotoxicity: Sodium Bisulfite is a non hazardous solution commonly used as a waste water dechloration agent. High concentrations will contribute to elevated chemical oxygen demand in aquatic environments.

Environmental Transport: Soluble in water.

Environmental Degradation: Rapid biological decomposition.

Soil Absorption/Mobility: Slight.

Section 13 - Disposal Considerations

Disposal: Waste determinations typically consider Sodium Bisulfite contaminated materials to be non-hazardous.

Disposal Regulatory Requirements: Follow applicable Federal, state and local regulations.

Container Cleaning and Disposal: Follow applicable Federal, state and local regulations.

Section 14 - Transport Information

Shipping Name: Bisulfites, aqueous solutions, n.o.s.
Technical Name: Sodium Bisulfite
Shipping Symbols: Corrosive
Hazard Class: 8 - Corrosive
Subsidiary Hazard: NA
ID No. (Placard): UN2693
Packing Group: III
Label: Required
Reputable Quantity: (RQ) 5,000 Lbs
Section 15 - Regulatory Information

EPA Regulations:
- CERCLA Reportable Quantity (RQ): 5000 pounds
- SARA Title III: Not listed.
- FIFRA: Not regulated.
- TSCA: Inventory listed chemical; PAIR Reportable; Not listed in Toxic Substances Chemical Index

OSHA Regulations:
- OSHA Specifically Regulated Substance: Not listed.

Other Regulations:
- FDA: Regulated when used as a food preservative.
- Proposition 65 (California): Not Listed

Section 16 - Other Information

This product is NSF certified to NSF/ANSI Standard 60 and is subject to a maximum use limit (MUL) of 46 mg/L for potable water dechlorination applications.

Previous SDS issue date: March, 2015
Current SDS issue date: May, 2015
Reason for current revision: Change in sodium sulfite limit from < 3.5 to < 1.0 % (Section 3).

The information herein is believed to be reliable. However, no warranty, expressed or implied, is made as to its accuracy or completeness and none is made as to the fitness of this material for any purpose. The manufacturer shall not be liable for damages to person or property resulting from its use. Nothing herein shall be construed as a recommendation for use in violation of any patent.
1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name: Sodium Carbonate, Anhydrous

Other means of identification

Product Code(s): 497-19-8

Synonyms: Sodium carbonate; Carbonic acid, disodium salt; Disodium carbonate

Chemical Family: Alkali salt

Recommended use of the chemical and restrictions on use

Recommended Use:
Glass manufacture, Personal care, Detergent, Water treatment chemical, Chemical processing

Restrictions on Use:
See section 16 for more information

Manufacturer Address

Tronox Alkali Wyoming Corporation
1735 Market Street
Philadelphia, PA 19103
Tel: +1 877-362-2248 or +1 215-299-6904
www.tronox.com

Emergency telephone number

1 307 / 872 2452 (Plant - Green River, WY)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status

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

Serious eye damage/eye irritation Category 2
GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Warning

Hazard Statements
H319 - Causes serious eye irritation

Precautionary Statements - Prevention
P264 - Wash face, hands and any exposed skin thoroughly after handling
P280 - Wear eye protection/ face protection

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Family</th>
<th>Alkali salt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>Na₂CO₃</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium carbonate</td>
<td>497-19-8</td>
<td>100</td>
</tr>
</tbody>
</table>

Synonyms are provided in Section 1.

4. FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Skin Contact
Wash off with warm water and soap. Get medical attention if irritation develops and persists. Remove and wash contaminated clothing before re-use.

Inhalation
Remove person to fresh air. If signs/symptoms continue, get medical attention.
Ingestion
Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

Most important symptoms and effects, both acute and delayed
Causes serious eye damage / eye irritation.

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

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing agent suitable for type of surrounding fire.

Specific Hazards Arising from the Chemical
Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products
Fumes of sodium oxide. Carbon oxides (COx).

Explosion data
Sensitivity to Mechanical Impact
Not sensitive.

Sensitivity to Static Discharge
Not sensitive.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid dust formation. Sweep up to prevent slipping hazard.

Other
For further clean-up instructions, call Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

Environmental Precautions
Do not flush into surface water or sanitary sewer system.

Methods for Containment
Prevent large quantities of this product from contacting vegetation or waterways. Cover with plastic sheet to prevent spreading. Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal.

Methods for cleaning up
Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling
Use air conveying/mechanical systems for bulk transfer to storage. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment if release of airborne dust is expected.

Storage
Store in original container. Keep in properly labeled containers. Keep container tightly closed.

Incompatible products

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies. Local nuisance dust standards apply.
Appropriate engineering controls

Engineering measures Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Tightly fitting safety goggles.
Skin and Body Protection Wear suitable protective clothing. Protective shoes or boots.
Hand Protection Nitrile rubber, Neoprene gloves
Respiratory Protection In case of inadequate ventilation wear respiratory protection.
Hygiene measures Handle in accordance with good industrial hygiene and safety practice.
General information These recommendations apply to the product as supplied

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Granules</td>
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<tr>
<td>Physical State</td>
<td>Solid</td>
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<tr>
<td>Color</td>
<td>White</td>
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<tr>
<td>Odor</td>
<td>odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>11.4 (1% solution in water)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>851 °C</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes</td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td>No information available</td>
</tr>
<tr>
<td>Upper flammability limit</td>
<td>No information available</td>
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<tr>
<td>Lower flammability limit</td>
<td>No information available</td>
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<tr>
<td>Vapor pressure</td>
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<tr>
<td>Specific gravity</td>
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<td>Water solubility</td>
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<tr>
<td>Solubility in other solvents</td>
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</tr>
<tr>
<td>Partition coefficient</td>
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</tr>
<tr>
<td>Autoignition temperature</td>
<td>No information available</td>
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<tr>
<td>Decomposition temperature</td>
<td>400 °C</td>
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<tr>
<td>Viscosity, kinematic</td>
<td>No information available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Non-oxidizing</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>105.99</td>
</tr>
<tr>
<td>Bulk density</td>
<td>0.86 - 1.12 g/cm³ (Dense grades) 0.70 - 0.90 g/cm³ (Light Grades)</td>
</tr>
<tr>
<td>Kct</td>
<td>0 bar m/s</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity None under normal use conditions.
Chemical Stability Stable. Decomposes by reaction with strong acid.
Possibility of Hazardous Reactions None under normal processing.
Hazardous polymerization Hazardous polymerization does not occur.
Conditions to avoid Exposure to air or moisture over prolonged periods.
Hazardous Decomposition Products Sodium oxides. Carbon oxides (COx).

11. TOXICOLOGICAL INFORMATION

Product Information

| LD50 Oral   | 2,800 mg/kg (rat) |
| LD50 Dermal | > 2,000 mg/kg (rabbit) |
| LC50 Inhalation | 2.3 mg/L (rat) |

Eye Contact Irritating to eyes.
Skin Contact Non-irritating
Sensitization Patch test on human volunteers did not demonstrate sensitization properties.

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic toxicity No known effect.
Mutagenicity No information available
Carcinogenicity Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).
Reproductive toxicity No information available.
STOT - single exposure No information available.
STOT - repeated exposure No information available.
Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Duration</th>
<th>Species</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Carbonate</td>
<td>96 h LC50</td>
<td>Bluegill sunfish</td>
<td>300</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Carbonate</td>
<td>48 h EC50</td>
<td>Ceriodaphnia</td>
<td>200-227</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

Persistence and degradability Biodegradability does not pertain to inorganic substances.
Bioaccumulation Does not bioaccumulate.
Mobility Dissociates into ions.
Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS
Waste disposal methods
This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). Dispose of in accordance with local regulations.

Contaminated Packaging
Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT
NOT REGULATED

TDG
NOT REGULATED

ICAO/IATA
NOT REGULATED

IMDG/IMO
NOT REGULATED

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
Acute health hazard  Yes
Chronic health hazard No
Fire hazard No
Sudden release of pressure hazard No
Reactive Hazard No

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations
This product does not contain any substances regulated by state right-to-know regulations

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA (United States)</th>
<th>DSL (Canada)</th>
<th>EINECS/ELINCS (Europe)</th>
<th>ENCS (Japan)</th>
<th>China (IECSC)</th>
<th>KECL (Korea)</th>
<th>PICCS (Philippines)</th>
<th>AICS (Australia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium carbonate 497-19-8 (100)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Mexico - Grade

Moderate risk, Grade 2

WHMIS Hazard Class

D2B - Toxic materials, Eye irritation

Class E: Corrosive to aluminum. Not corrosive to animal skin or carbon steel.

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Special Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Physical hazard</th>
<th>Personal Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
</tbody>
</table>

NFPA/HMIS Ratings Legend

Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Product Certifications

This product meets the chemical testing specifications defined in the Food Chemicals Codex (FCC), 8th Edition.

This product is certified to NSF/ANSI Standard 60 for use in drinking water treatment at the specified maximum use limit. The MUL (maximum use level) for sodium carbonate, anhydrous is 150 mg/L under NSF/ANSI Standard 60.

Revision date: 2015-03-30
Revision note: Minor change

Disclaimer

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Prepared By:

Tronox Limited

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End of Safety Data Sheet
SAFETY DATA SHEET
Sodium Carbonate, Anhydrous

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name: Sodium Carbonate, Anhydrous

Other means of identification

Product Code(s): 497-19-8

Synonyms: Sodium carbonate; Carbonic acid, disodium salt; Disodium carbonate

Chemical Family: Alkali salt

Recommended use of the chemical and restrictions on use

Recommended Use: Glass manufacture, Personal care, Detergent, Water treatment chemical, Chemical processing

Restrictions on Use: See section 16 for more information

Manufacturer Address

Tronox Alkali Wyoming Corporation
1735 Market Street
Philadelphia, PA 19103
Tel: +1 877-362-2248 or +1 215-299-6904
www.tronox.com

Emergency telephone number

1 307 / 872 2452 (Plant - Green River, WY)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status

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

| Serious eye damage/eye irritation | Category 2 |
EMERGENCY OVERVIEW

Warning

Hazard Statements
H319 - Causes serious eye irritation

Precautionary Statements - Prevention
P264 - Wash face, hands and any exposed skin thoroughly after handling
P280 - Wear eye protection/ face protection

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium carbonate</td>
<td>497-19-8</td>
<td>100</td>
</tr>
</tbody>
</table>

Synonyms are provided in Section 1.

4. FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Skin Contact
Wash off with warm water and soap. Get medical attention if irritation develops and persists. Remove and wash contaminated clothing before re-use.

Inhalation
Remove person to fresh air. If signs/symptoms continue, get medical attention.
Ingestion

Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

Most important symptoms and effects, both acute and delayed

Causes serious eye damage / eye irritation.

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

Treat symptomatically.

---

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing agent suitable for type of surrounding fire.

Specific Hazards Arising from the Chemical

Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products

Fumes of sodium oxide. Carbon oxides (COx).

Explosion data

Sensitivity to Mechanical Impact

Not sensitive.

Sensitivity to Static Discharge

Not sensitive.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

---

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Avoid dust formation. Sweep up to prevent slipping hazard.

Other

For further clean-up instructions, call Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

Environmental Precautions

Do not flush into surface water or sanitary sewer system.

Methods for Containment

Prevent large quantities of this product from contacting vegetation or waterways. Cover with plastic sheet to prevent spreading. Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal.

Methods for cleaning up

Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal. Dispose of waste as indicated in Section 13.

---

7. HANDLING AND STORAGE

Handling

Use air conveying/mechanical systems for bulk transfer to storage. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment if release of airborne dust is expected.

Storage

Store in original container. Keep in properly labeled containers. Keep container tightly closed.

Incompatible products

Aluminium. Powdered aluminum. Acids

---

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies. Local nuisance dust standards apply.
Appropriate engineering controls

Engineering measures Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Tightly fitting safety goggles.

Skin and Body Protection Wear suitable protective clothing. Protective shoes or boots.

Hand Protection Nitrile rubber, Neoprene gloves

Respiratory Protection In case of inadequate ventilation wear respiratory protection.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice.

General information These recommendations apply to the product as supplied

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Granules</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>11.4 (1% solution in water)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>851 °C</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes</td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>No information available</td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No information available</td>
</tr>
<tr>
<td>Density</td>
<td>No information available</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>2.52</td>
</tr>
<tr>
<td>Water solubility</td>
<td>212.5 g/L @ 20 °C</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No information available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>400 °C</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No information available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Non-oxidizing</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>105.99</td>
</tr>
<tr>
<td>Bulk density</td>
<td>0.86 - 1.12 g/cm³ (Dense grades) 0.70 - 0.90 g/cm³ (Light Grades)</td>
</tr>
<tr>
<td>Kst</td>
<td>0 bar m/s</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity None under normal use conditions.

Chemical Stability Stable. Decomposes by reaction with strong acid.
Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Exposure to air or moisture over prolonged periods.

Incompatible materials


Hazardous Decomposition Products

Sodium oxides. Carbon oxides (COx).

11. TOXICOLOGICAL INFORMATION

Product Information

<table>
<thead>
<tr>
<th>LD50 Oral</th>
<th>2,800 mg/kg (rat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 Dermal</td>
<td>&gt; 2,000 mg/kg (rabbit)</td>
</tr>
<tr>
<td>LC50 Inhalation</td>
<td>2.3 mg/L (rat)</td>
</tr>
</tbody>
</table>

Eye Contact

Irritating to eyes.

Skin Contact

Non-irritating

Sensitization

Patch test on human volunteers did not demonstrate sensitization properties.

Information on toxicological effects

Symptoms

No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic toxicity

No known effect.

Mutagenicity

No information available

Carcinogenicity

Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).

Reproductive toxicity

No information available.

STOT - single exposure

No information available.

STOT - repeated exposure

No information available.

Aspiration hazard

No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

<table>
<thead>
<tr>
<th>Sodium carbonate (497-19-8)</th>
<th>Duration</th>
<th>Species</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Ingredient(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Carbonate</td>
<td>96 h LC50</td>
<td>Bluegill sunfish</td>
<td>300</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Carbonate</td>
<td>48 h EC50</td>
<td>Ceriodaphnia</td>
<td>200-227</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

Persistence and degradability

Biodegradability does not pertain to inorganic substances.

Bioaccumulation

Does not bioaccumulate.

Mobility

Dissociates into ions.

Other Adverse Effects

None known.

13. DISPOSAL CONSIDERATIONS
Waste disposal methods
This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). Dispose of in accordance with local regulations.

Contaminated Packaging
Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT
NOT REGULATED

TDG
NOT REGULATED

ICAO/IATA
NOT REGULATED

IMDG/IMO
NOT REGULATED

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

- Acute health hazard: Yes
- Chronic health hazard: No
- Fire hazard: No
- Sudden release of pressure hazard: No
- Reactive Hazard: No

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations
This product does not contain any substances regulated by state right-to-know regulations

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA (United States)</th>
<th>DSL (Canada)</th>
<th>EINECS/ELINCS (Europe)</th>
<th>ENCS (Japan)</th>
<th>China (IECSC)</th>
<th>KECL (Korea)</th>
<th>PICCS (Philippines)</th>
<th>AICS (Australia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium carbonate 497-19-8 (100)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Sodium Carbonate, Anhydrous

Mexico - Grade

Moderate risk, Grade 2

WHMIS Hazard Class

D2B - Toxic materials, Eye irritation

Class E : Corrosive to aluminum. Not corrosive to animal skin or carbon steel.

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Special Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Physical hazard</th>
<th>Personal Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
</tbody>
</table>

NFPA/HMIS Ratings Legend

Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Product Certifications

This product meets the chemical testing specifications defined in the Food Chemicals Codex (FCC), 8th Edition.

This product is certified to NSF/ANSI Standard 60 for use in drinking water treatment at the specified maximum use limit. The MUL (maximum use level) for sodium carbonate, anhydrous is 150 mg/L under NSF/ANSI Standard 60.

Certified to NSF/ANSI 60

American Water Works Association

Prepared By:

Tronox Limited

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End of Safety Data Sheet
1. Identification

Product identifier: CAUSTIC SODA 50%

Other means of identification

Synonyms: Sodium Hydroxide

SDS number: 000100000088

Recommended use and restriction on use

Recommended use: Not available.

Restrictions on use: Not known.

Emergency telephone number: For emergency assistance involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

2. Hazard(s) identification

Hazard classification

Health hazards

Acute toxicity (Oral) Category 4

Skin corrosion/irritation Category 1A

Serious eye damage/eye irritation Category 1

Environmental hazards

Acute hazards to the aquatic environment Category 3

Label elements

Hazard symbol

!!!
Signal word

Danger

Hazard statement

Corrosive.
Harmful if swallowed.
Causes severe skin burns and eye damage.

Precautionary statement

Prevention

Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust or mists. 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 ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. IF SWALLOWED: Call a POISON CENTER/doctor/ if you feel unwell. Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. Specific treatment (see this label). Wash contaminated clothing before reuse.

Storage

Store in a closed container. Keep container tightly closed. Store in a well-ventilated place. Store in a dry place. 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

<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>Sodium hydroxide</td>
<td></td>
<td>1310-73-2</td>
<td>&gt;=48 - &lt;=52%</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>7732-18-5</td>
<td>&gt;=48 - &lt;=52%</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td></td>
<td>7647-14-5</td>
<td>&gt;=0 - &lt;=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: CAUTION! First aid personnel must be aware of own risk during rescue!

Ingestion: Do NOT induce vomiting. Never give liquid to an unconscious person. Get medical attention immediately.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped. Get medical attention immediately.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Eye contact: If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

Most important symptoms/effects, acute and delayed

Symptoms: No data available.

Indication of immediate medical attention and special treatment needed

Treatment: No data available.

5. Fire-fighting measures

General fire hazards: No data available.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use: Powder. In case of fire in the surroundings: all extinguishing agents allowed.

Unsuitable extinguishing media: No data available.
Specific hazards arising from the chemical: No data available.

Special protective equipment and precautions for firefighters
Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: No data available.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep unauthorized personnel away.

Methods and material for containment and cleaning up: Absorb spillage with non-combustible, absorbent material. Dike for later disposal.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Use only with adequate ventilation. Container must be kept tightly closed.

Conditions for safe storage, including any incompatibilities: No data available.
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>Sodium hydroxide</td>
<td>Ceiling</td>
<td>2 mg/m³</td>
<td>US. ACGIH Threshold Limit Values (03 2013)</td>
</tr>
<tr>
<td>Ceil _Time</td>
<td>2 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2010)</td>
<td></td>
</tr>
<tr>
<td>PEL</td>
<td>2 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>Ceiling</td>
<td>2 mg/m³</td>
<td>US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)</td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td>2 mg/m³</td>
<td>US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)</td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide - Particulate.</td>
<td>ST ESL</td>
<td>20 µg/m³</td>
<td>US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)</td>
</tr>
<tr>
<td>AN ESL</td>
<td>2 µg/m³</td>
<td>US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)</td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>Ceiling</td>
<td>2 mg/m³</td>
<td>US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)</td>
</tr>
</tbody>
</table>

Appropriate engineering controls

No data available.

Individual protection measures, such as personal protective equipment

General information: Use personal protective equipment as required. 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. Practice good housekeeping.

Eye/face protection: Use personal protective equipment as required. Wear goggles/face shield.

Skin protection

Hand protection: No data available.
Other: No data available.
Respiratory protection: No data available.
Hygiene measures: No data available.

9. Physical and chemical properties

<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>No data available.</td>
</tr>
<tr>
<td>Color</td>
<td>No data available.</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>14</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-12 - 10 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>105 - 140 °C</td>
</tr>
<tr>
<td>Flash Point</td>
<td>No data available.</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>
<tr>
<td>Upper/lower limit on flammability or explosive limits</td>
<td></td>
</tr>
<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>No data available.</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Solubility in water</td>
<td>No data available.</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 data available.
Chemical stability: No data available.
Possibility of hazardous reactions: No data available.
Conditions to avoid: No data available.
Incompatible materials: No data available.
Hazardous decomposition products: No data available.

11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion: No data available.
Inhalation: No data available.
Skin contact: No data available.
Eye contact: No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: ATEmix (): 353.488372 mg/kg
Dermal
Product: Not classified for acute toxicity based on available data.
Inhalation
Product: No data available.

Specified substance(s):
Sodium Chloride LC 50 (Rat, ): > 42 mg/l 2 (reliable with restrictions)

Repeated dose toxicity
Product: No data available.

Skin corrosion/irritation
Product: No data available.

Serious eye damage/eye irritation
Product: No data available.

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

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.
Specified substance(s):
Sodium hydroxide
LC 50 (Western mosquitofish (Gambusia affinis), 24 h): 125 mg/l Mortality
LC 50 (Guppy (Poecilia reticulata), 24 h): 145 mg/l Mortality LC 50 (Goldfish (Carassius auratus), 24 h): 160 mg/l Mortality LC 50 (Bony fish superclass (Osteichthyes), 48 h): 33 - 100 mg/l Mortality LC 50 (Western mosquitofish (Gambusia affinis), 48 h): 125 mg/l Mortality

Aquatic invertebrates
Product: No data available.
Specified substance(s):
Sodium hydroxide
EC 50 (Water flea (Ceriodaphnia dubia), 48 h): 34.59 - 47.13 mg/l Intoxication LC 50 (Common shrimp, sand shrimp (Crangon crangon), 48 h): 33 - 100 mg/l Mortality LC 50 (Cockle (Cerastoderma edule), 48 h): 330 -
1,000 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: No data available.
- **BOD/COD ratio**
  - Product: No data available.

**Bioaccumulative potential**
- **Bioconcentration factor (BCF)**
  - Product: No data available.
- **Partition coefficient n-octanol / water (log Kow)**
  - Product: No data available.

**Mobility in soil:**
- No data available.

**Known or predicted distribution to environmental compartments**
- **Sodium hydroxide**
  - No data available.
- **Water**
  - No data available.
- **Sodium chloride**
  - No data available.

**Known or predicted distribution to environmental compartments**
- **Water**
  - No data available.

### 13. Disposal considerations

**Disposal instructions:**
- No data available.

**Contaminated packaging:**
- No data available.

### 14. Transport information

**DOT**
- **UN number:** UN 1824
- **UN proper shipping name:** Sodium hydroxide solution
- **Transport hazard class(es)**
  - **Class:** 8
  - **Label(s):** 8
- **Packing group:** II
- **Marine Pollutant:** Not regulated.

SDS_US - 000100000088 9/13
Special precautions for user: –

**IMDG**

- UN number: UN 1824
- UN proper shipping name: SODIUM HYDROXIDE SOLUTION
- Transport hazard class(es):
  - Class: 8
  - Label(s): 8
  - EmS No.: F-A, S-B
- Packing group: II
- Marine Pollutant: Not regulated.
- Special precautions for user: –

**IATA**

- UN number: UN 1824
- Proper Shipping Name: Sodium hydroxide solution
- Transport hazard class(es):
  - Class: 8
  - Label(s): 8
- Packing group: II
- Environmental hazards: Not regulated.
- Special precautions for user: –
- Other information:
  - Passenger and cargo aircraft: Allowed.
  - Cargo aircraft only: Allowed.

### 15. Regulatory information

**US federal regulations** 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):

- Sodium hydroxide
  - Reportable quantity: 1000 lbs.

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

- Hazard categories
  - Not listed.
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>
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SARA 311/312 Hazardous chemical

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<tr>
<td>Sodium Chloride</td>
<td>500 lbs</td>
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SARA 313 (TRI reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
Sodium hydroxide
Reportable quantity: 1000 lbs.

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
Sodium hydroxide Listed

US. Massachusetts RTK - Substance List
Sodium hydroxide Listed

US. Pennsylvania RTK - Hazardous Substances
Sodium hydroxide Listed

US. Rhode Island RTK
Sodium hydroxide Listed
**Inventory Status:**

- **Australia AICS:** Not in compliance with the inventory.
- **Canada DSL Inventory List:** Not in compliance with the inventory.
- **EU EINECS List:** Not in compliance with the inventory.
- **EU ELINCS List:** Not in compliance with the inventory.
- **Japan (ENCS) List:** Not in compliance with the inventory.
- **EU No Longer Polymers List:** Not 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:** Not in compliance with the inventory.
- **Philippines PICCS:** Not in compliance with the inventory.
- **US TSCA Inventory:** On or in compliance with the inventory.
- **New Zealand Inventory of Chemicals:** 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**

**HMIS Hazard ID**

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
<th>PERSONAL PROTECTION</th>
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<tbody>
<tr>
<td>* 3</td>
<td>0</td>
<td>1</td>
<td>B</td>
</tr>
</tbody>
</table>

- **B - Safety Glasses & Gloves**

**NFPA Hazard ID**

- **Health:** 3
- **Flammability:** 0
- **Reactivity:** 1
- **Special hazard:**

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; *Chronic health effect

**Issue date:** 04/29/2015
**Revision date:** No data available.
**Version #:** 1.2
**Further information:** No data available.
SAFETY DATA SHEET
Sodium Hypochlorite

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

PRODUCT NAME
Sodium Hypochlorite

SYNONYMS, TRADE NAMES
Bleach, Hypo, Everchlor, Chloros, Hispec, Bridos, Bleacol, Vo-redox 9110,

SUPPLIER
UNIVAR LTD
46 Peckover Street
BRADFORD
West Yorkshire
United Kingdom
BD1 5BD
Tel: +44 1274 377000
Fax: +44 1274 377001
sds@univareurope.com

SDS No.
S024

Emergency Contact Number (Office Hours)
+44 1274 377070

Emergency Contact Number (Outside Office Hours)
+44 1865 407333

2 HAZARDS IDENTIFICATION

Causes burns. Contact with acids liberates toxic gas.

CLASSIFICATION
C;R34, R31.

3 COMPOSITION/INFORMATION ON INGREDIENTS

<table>
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<tr>
<th>Name</th>
<th>EC No.</th>
<th>CAS-No.</th>
<th>Content</th>
<th>Classification</th>
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<tr>
<td>SODIUM HYPOCHLORITE SOLUTION, ... % Cl ACTIVE</td>
<td>231-668-3</td>
<td>7681-52-9</td>
<td>10-25%</td>
<td>C;R34 R31 N;R50</td>
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</table>

The Full Text for all R-Phrases are Displayed in Section 16

4 FIRST-AID MEASURES

INHALATION
Remove victim immediately from source of exposure. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION
NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Rinse mouth thoroughly. Get medical attention immediately!

SKIN CONTACT
Remove affected person from source of contamination. Remove contaminated clothing. Wash the skin immediately with soap and water. Get medical attention promptly if symptoms occur after washing.

EYE CONTACT
Remove victim immediately from source of exposure. Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Get medical attention immediately. Continue to rinse.

5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA
This product is not flammable. Use fire-extinguishing media appropriate for surrounding materials.
Sodium Hypochlorite

SPECIFIC HAZARDS
Chlorine. Oxygen.

PROTECTIVE MEASURES IN FIRE
Self contained breathing apparatus and full protective clothing must be worn in case of fire.

6 ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS
Wear protective clothing as described in Section 8 of this safety data sheet.

ENVIRONMENTAL PRECAUTIONS
Do not allow ANY environmental contamination. Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body.

SPILL CLEAN UP METHODS
DO NOT TOUCH SPILLED MATERIAL! Stop leak if possible without risk. Absorb in vermiculite, dry sand or earth and place into containers. Flush with plenty of water to clean spillage area.

7 HANDLING AND STORAGE

USAGE PRECAUTIONS
Avoid spilling, skin and eye contact.

STORAGE PRECAUTIONS
Store in tightly closed original container in a dry, cool and well-ventilated place. Keep in original container.

STORAGE CLASS
Corrosive storage.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

INGREDIENT COMMENTS
WEL = Workplace Exposure Limits

PROTECTIVE EQUIPMENT

PROCESS CONDITIONS
Provide eyewash, quick drench.

ENGINEERING MEASURES
Provide adequate ventilation. Observe Workplace Exposure Limits and minimise the risk of inhalation of vapours.

RESPIRATORY EQUIPMENT
No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

HAND PROTECTION
Use suitable protective gloves if risk of skin contact.

EYE PROTECTION
If risk of splashing, wear safety goggles or face shield.

OTHER PROTECTION
Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENE MEASURES
DO NOT SMOKE IN WORK AREA! Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes wet or contaminated. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke.

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
Liquid
Sodium Hypochlorite

**COLOUR**
Green yellow

**SOLUBILITY**
Completely soluble in water

**BOILING POINT (°C)**
>100

**RELATIVE DENSITY**
1.20 - 1.27

**MELTING POINT (°C)**
-17

**pH-VALUE, CONC. SOLUTION**
>12

### 10 STABILITY AND REACTIVITY

**STABILITY**
Stable under normal temperature conditions.

**CONDITIONS TO AVOID**
Avoid excessive heat for prolonged periods of time. Avoid contact with acids.

**MATERIALS TO AVOID**
Strong acids. Ammonia or amines. Hydrocarbons.

**HAZARDOUS DECOMPOSITION PRODUCTS**
Fire creates: Chlorine.

### 11 TOXICOLOGICAL INFORMATION

**TOXIC DOSE 1 - LD 50**
8910 mg/kg (oral rat)

**INHALATION**
May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

**INGESTION**
May cause burns in mucous membranes, throat, oesophagus and stomach.

**SKIN CONTACT**
May cause serious chemical burns of the skin.

**EYE CONTACT**
Causes burns.

### 12 ECOLOGICAL INFORMATION

**MOBILITY**
The product is soluble in water.

### 13 DISPOSAL CONSIDERATIONS

**GENERAL INFORMATION**
Do not puncture or incinerate even when empty.

**DISPOSAL METHODS**
Dispose of waste and residues in accordance with local authority requirements.

### 14 TRANSPORT INFORMATION

| UK ROAD CLASS | 8 |
| PROPER SHIPPING NAME | SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE |
| UN NO. ROAD | 1791 |
| ADR CLASS NO. | 8 |
| ADR PACK GROUP | III |
| HAZCHEM CODE | 2X |
| UK ROAD PACK GR. | III |
| ADR CLASS | Class 8: Corrosive substances. |
| ADR LABEL NO. | 8 |
| RID CLASS NO. | 8 |
**Sodium Hypochlorite**

**RID PACK GROUP**  III  
**UN NO. SEA**  1791  
**IMDG CLASS**  8  
**IMDG PACK GR.**  III  
**MARINE POLLUTANT NO.**  
**UN NO. AIR**  1791  
**AIR CLASS**  8  
**AIR PACK GR.**  III

### 15 REGULATORY INFORMATION

**LABELLING**

Contains SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**RISK PHRASES**

- R31 Contact with acids liberates toxic gas.
- R34 Causes burns.

**SAFETY PHRASES**

- P6 Warning! Do not use with other products. May release dangerous gases (chlorine).
- S1/2 Keep locked up and out of the reach of children.
- S28 After contact with skin, wash immediately with plenty of water.
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
- S50 Do not mix with acid.

**STATUTORY INSTRUMENTS**

Chemicals (Hazard Information and Packaging) Regulations.

**APPROVED CODE OF PRACTICE**

Safety Data Sheets for Substances and Preparations. Classification and Labelling of Substances and Preparations Dangerous for Supply.

**GUIDANCE NOTES**

Workplace Exposure Limits EH40. CHIP for everyone HSG(108).

### 16 OTHER INFORMATION

**REVISION DATE**  9th August 2007  
**REV. NO./REPL. SDS GENERATED**  07  
**SDS NO.**  S024  
**DATE**  9th August 2007  
**SIGNATURE**  Jitendra Panchal  
**RISK PHRASES IN FULL**

- R31 Contact with acids liberates toxic gas.
- R34 Causes burns.
- R50 Very toxic to aquatic organisms.
1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS BD1500

PRODUCT APPLICATION AREA:

WATER-BASED DEPOSIT CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media:
dry chemical, carbon dioxide, foam or water
POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing.
Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes
with plenty of low-pressure water for at least 15 minutes. Get
immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air
and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive
victim. Do not induce vomiting. Immediately contact physician.
Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing
apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F  > 93C SETA(CC)

6 ACCIDENTAL RELEASE MEASURES
PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is. Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Do not mix with acidic material.

STORAGE:
Keep containers closed when not in use. Reasonable and safe chemical storage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS
This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA’S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR’S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav. (70F,21C)  1.020  Vapor Pressure (mmHG)  - 18.0
Freeze Point (F)  31  Vapor Density (air=1)  < 1.00
Freeze Point (C)  -1

Viscosity(cps 70F,21C)  30  % Solubility (water)  100.0

Odor  Slight
Appearance  Colorless
Physical State  Liquid
Flash Point  SETA(CC)  > 200F > 93C
pH As Is (approx.)  12.5
Evaporation Rate (Ether=1)  < 1.00

NA = not applicable  ND = not determined
10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >2,000 mg/kg
NOTE - Estimated value

Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Estimated value

Inhalation LC50 RAT: >20 mg/L/hr
NOTE - Estimated value

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Acute Bioassay
0% Mortality= 2000 mg/L
Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal
0% Mortality= 2000 mg/L
Menidia beryllina (Silversides) 96 Hour Static Acute Bioassay
0% Mortality= 5000 mg/L
Mysid Shrimp 96 Hour Static Acute Bioassay
25% Mortality= 5000; No Effect Level= 2500 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
No Effect Level= 3000 mg/L

BIODEGRADATION
BOD-28 (mg/g): 5
BOD-5 (mg/g): 4
COD (mg/g): 341
TOC (mg/g): 80

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is:
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD: Not Applicable
UN / NA NUMBER: Not applicable
DOT EMERGENCY RESPONSE GUIDE #: Not applicable
15  REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

USDA FOOD PLANT APPROVALS:
This product is composed of ingredients previously approved by USDA to meet G5 and G7 classification and may be used in water for cooking/cooling or in boiler or cooling systems with no food contact.

SARA SECTION 312 HAZARD CLASS:
Product is non-hazardous under Section 311/312

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:
No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16  OTHER INFORMATION

<table>
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<tr>
<th>NFPA/HMIS</th>
<th>CODE TRANSLATION</th>
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<td>Fire</td>
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<tr>
<td>Reactivity</td>
<td>0</td>
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(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

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1 Identification

Identification of substance or preparation
STEAMATE PAS6074

Product Application Area
Steam condensate treatment.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940


2 Hazard(s) identification

********************************************************************************

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Absorbed by skin. Potential skin sensitizer.
Corrosive to the eyes. Irritation of the upper respiratory tract.
Prolonged exposure may cause dizziness and headache.

DOT hazard: Corrosive to skin, Combustible
Odor: Amine; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, or foam--Water spray should be used only to cool fire-exposed containers and disperse vapors.

********************************************************************************

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Toxic; Corrosive to skin. Absorbed by skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure; Irritation of the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

**INGESTION EFFECTS:**
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in large doses or aspirated.

**TARGET ORGANS:**
Prolonged or repeated exposures may cause toxicity to the liver, kidney, nervous system, and blood, CNS depression and tissue necrosis.

**MEDICAL CONDITIONS AGGRAVATED:**
Pre-existing skin disorders and chronic respiratory disease.

**SYMPTOMS OF EXPOSURE:**
Inhalation may cause irritation of mucous membranes and respiratory tract. Skin contact causes severe irritation or burns.

### 3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

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<th>Cas#</th>
<th>Chemical Name</th>
<th>Range(w/w%)</th>
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<td>108-91-8</td>
<td>CYCLOHEXYLAMINE</td>
<td>15-40</td>
</tr>
<tr>
<td></td>
<td>Flammable; corrosive; Category 2 suspected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reproductive toxicant</td>
<td></td>
</tr>
<tr>
<td>110-91-8</td>
<td>MORPHOLINE</td>
<td>7-13</td>
</tr>
<tr>
<td></td>
<td>Flammable liquid; Cat-1B skin corrosive; IARC-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(carcinogen status not classifiable)</td>
<td></td>
</tr>
<tr>
<td>141-43-5</td>
<td>MONOETHANOLAMINE</td>
<td>7-13</td>
</tr>
<tr>
<td></td>
<td>Combustible; Cat-1B skin corrosive</td>
<td></td>
</tr>
<tr>
<td>7173-62-8</td>
<td>N-9-OCTADECENYL-1,3-PROPANEDIAMINE</td>
<td>7-13</td>
</tr>
<tr>
<td></td>
<td>Corrosive (skin and eyes)</td>
<td></td>
</tr>
<tr>
<td>112-90-3</td>
<td>9-OCTADECEN-1-AMINE, (Z)-</td>
<td>1-5</td>
</tr>
<tr>
<td></td>
<td>Corrosive (skin)</td>
<td></td>
</tr>
</tbody>
</table>

### 4 First-aid measures

**SKIN CONTACT:**
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

**EYE CONTACT:**
URGENT! Immediately flush eyes with water for 30 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical
INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage. Aspiration into the lungs will result in chemical pneumonia and may be fatal.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, or foam--Water spray should be used only to cool fire-exposed containers and disperse vapors.

HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, ammonia and volatile amines

FLASH POINT:
131F  55C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is – Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:
Flammable. Corrosive to skin and eyes. Corrosive to metal.

STORAGE:
Store between 40 and 100F (4 and 38C). Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers. Keep away from flames or sparks. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Avoid atmospheric exposure. Store away from acids.

8 Exposure controls / personal protection
EXPOSURE LIMITS

CHEMICAL NAME

CYCLOHEXYLAMINE
PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.
TLV (ACGIH): TWA = 10 PPM; A4

MORPHOLINE
PEL (OSHA): 20 PPM (30PPM-STEL)-SKIN
TLV (ACGIH): 20 PPM (30PPM-STEL)-SKIN-A4

MONOETHANOLAMINE
PEL (OSHA): 3 PPM (6 MG/M3)
TLV (ACGIH): TWA = 3 PPM; STEL = 6 PPM

N-9-OCTADECENYL-1,3-PROPANEDIAMINE
PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.
TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

9-OCTADECEN-1-AMINE, (Z)-
PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.
TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

8) EXPOSURE CONTROLS/PERSONAL PROTECTION (continued)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA’S 29 CFR
1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER
WORKPLACE CONDITIONS WARRANT A RESPIRATOR’S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED
WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.
SKIN PROTECTION:
gauntlet-type butyl gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles, face shield

9  Physical and chemical properties

Spec. Grav.(70F,21C) 0.976  Vapor Pressure (mmHG) ~ 18.0
Freeze Point (F) -4  Vapor Density (air=1) < 1.00
Freeze Point (C) -20  % Solubility (water) 100.0
Viscosity(cps 70F,21C) 24  Odor Amine
Appearance Colorless To Light Yellow
Physical State Liquid
Flash Point P-M(CC) 131F  55C
pH As Is (approx.) > 13.0
Evaporation Rate (Ether=1) < 1.00

Substance or Preparation: STEAMATE PAS6074
10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:
Friction, heat or other sources of ignition may cause a violent reaction releasing heat and toxic fumes. Contact with oxidizers may cause fire or explosion. Contact with strong acids may cause a violent reaction releasing heat.

INCOMPATIBILITIES:
May react with acids or strong oxidizers.

DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, ammonia and volatile amines

11 Toxicological information

Oral LD50 RAT: 560 mg/kg
NOTE - Calculated value
Dermal LD50 RABBIT: 890 mg/kg
NOTE - Calculated value

12 Ecological information

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 1.8; No Effect Level= 1 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 1.3; No Effect Level= 1 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 1.4; No Effect Level= 1 mg/L

BIODEGRADATION
No Data Available.

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is:
D001=Ignitable; D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation Hazard: Corrosive to skin, Combustible
DOT: AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.(CYCLOHEXYLAMINE, MORPHOLINE)
8(3), UN2734, PG II

DOT EMERGENCY RESPONSE GUIDE #: 132

Note: Some containers may be DOT exempt, please check BOL for exact container classification

IATA: AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, MORPHOLINE)
8(3), UN2734, PG II

IMDG: AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, MORPHOLINE)
8(3), UN2734, PG II

15 Regulatory information

TSCA:
All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
6,185 gallons due to CYCLOHEXYLAMINE;

NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: Not Registered

SARA SECTION 312 HAZARD CLASS:
Immediate (acute); Delayed (Chronic); Fire

SARA SECTION 302 CHEMICALS:

<table>
<thead>
<tr>
<th>CAS#</th>
<th>CHEMICAL NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>108-91-8</td>
<td>CYCLOHEXYLAMINE</td>
</tr>
</tbody>
</table>

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
This product contains one or more ingredients known to the state of California to cause cancer and reproductive toxicity.

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII                  CODE TRANSLATION

| Health   | 3       | Serious Hazard |
| Fire     | 2       | Moderate Hazard |
| Reactivity | 0     | Minimal Hazard |
| Special  | CORR    | DOT corrosive  |
| (1) Protective Equipment | D | Goggles, Face Shield, Gloves, Apron |

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

<table>
<thead>
<tr>
<th>EFFECTIVE DATE</th>
<th>REVISIONS TO SECTION</th>
<th>SUPERCEDES</th>
</tr>
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<tbody>
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<td></td>
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</tr>
<tr>
<td>Date</td>
<td>Number</td>
<td>Date</td>
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<tr>
<td>------------</td>
<td>--------</td>
<td>------------</td>
</tr>
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<td>14</td>
<td>24-MAR-2011</td>
</tr>
<tr>
<td>29-OCT-2012</td>
<td>12</td>
<td>27-JUL-2011</td>
</tr>
</tbody>
</table>
### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier
- **Product form**: Substance
- **Substance name**: Sulfuric Acid, ACS
- **CAS No**: 7664-93-9
- **Product code**: LC25550
- **Formula**: H2SO4
- **Synonyms**: battery acid / brown acid / brown oil of vitriol / dihydrogen sulfate / dipping acid / electrolyte acid / nordhausen acid / oil of vitriol / sulphuric acid
- **BIG no**: 14049

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against
- **Use of the substance/mixture**: Industrial use, Laboratory chemical, Battery: component

#### 1.3. Details of the supplier of the safety data sheet
- **LabChem Inc**
  - Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
  - Zelienople, PA 16063 - USA
  - T 412-826-5230 - F 724-473-0647
  - info@labchem.com - www.labchem.com

#### 1.4. Emergency telephone number
- **Emergency number**: CHEMTREC: 1-800-424-9300 or 011-703-527-3887

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture
- **GHS-US classification**
  - Skin Corr. 1A H314
  - Eye Dam. 1 H318
  - Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labelling
- **Hazard pictograms (GHS-US)**: GHS05
- **Signal word (GHS-US)**: Danger
- **Hazard statements (GHS-US)**: H314 - Causes severe skin burns and eye damage
- **Precautionary statements (GHS-US)**:
  - P260 - Do not breathe mist, vapours, spray
  - P264 - Wash exposed skin thoroughly after handling
  - P280 - Wear protective gloves, protective clothing, eye protection, face protection
  - P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
  - P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
  - P304+P340 - IF INHALED: remove victim to fresh air and keep at rest in a position comfortable for breathing
  - P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
  - P310 - Immediately call a POISON CENTER or doctor/physician
  - P363 - Wash contaminated clothing before reuse
  - P405 - Store locked up
  - P501 - Dispose of contents/container to comply with local, state and federal regulations
2.3. Other hazards

Other hazards not contributing to the classification: None.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type: Mono-constituent

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric Acid, ACS (Main constituent)</td>
<td>(CAS No) 7664-93-9</td>
<td>96</td>
<td>Skin Corr. 1A, H314 Eye Dam. 1, H318</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures


First-aid measures after inhalation: Remove the victim into fresh air. Immediately consult a doctor/medical service.

First-aid measures after skin contact: Wash immediately with lots of water (15 minutes)/shower. Do not apply (chemical) neutralizing agents. Remove clothing while washing. Do not remove clothing if it sticks to the skin. Cover wounds with sterile bandage. Consult a doctor/medical service. If burned surface > 10%: take victim to hospital.

First-aid measures after eye contact: Rinse immediately with plenty of water for 15 minutes. Take victim to an ophthalmologist. Do not apply neutralizing agents.


4.2. Most important symptoms and effects, both acute and delayed


Symptoms/injuries after skin contact: Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact: Corrosion of the eye tissue. Permanent eye damage.


4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media


5.2. Special hazards arising from the substance or mixture

Fire hazard: DIRECT FIRE HAZARD. Non combustible. INDIRECT FIRE HAZARD. Reactions involving a fire hazard: see "Reactivity Hazard".

Explosion hazard: INDIRECT EXPLOSION HAZARD. Reactions with explosion hazards: see "Reactivity Hazard".

Reactivity: Violent exothermic reaction with water (moisture): release of corrosive gases/vapours. Reacts on exposure to water (moisture) with (some) metals: release of highly flammable gases/vapours (hydrogen). On heating/burning: release of toxic and corrosive gases/vapours (sulphur oxides). Reacts violently with (some) bases: heat release resulting in increased fire or explosion risk. Reacts with many compounds e.g.: with (strong) reducers, with organic material and with combustible materials: (increased) risk of fire/explosion.
5.3. Advice for firefighters

Precautionary measures fire: Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows.

Firefighting instructions: Cool tanks/drums with water spray/remove them into safety. When cooling/extinguishing: no water in the substance. Dilute toxic gases with water spray.


SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel


6.1.2. For emergency responders

Protective equipment: Equip cleanup crew with proper protection.

Emergency procedures: Stop leak if safe to do so. Ventilate area.

6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up


Methods for cleaning up: Take up liquid spill into inert absorbent material, e.g.: dry sand/earth/vermiculite. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Damaged/cooled tanks must be emptied. See "Material-handling" for suitable container materials. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Keep the substance free from contamination. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Never add water to this product. Never dilute by pouring water to the acid. Always add the acid to the water. Keep away from naked flames/heat. Observe very strict hygiene - avoid contact. Keep container tightly closed. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

Hygiene measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Incompatible products: Strong bases. metals. combustible materials.

Heat and ignition sources: KEEP SUBSTANCE AWAY FROM: heat sources.


Storage area: Store in a dry area. Ventilation at floor level. Keep locked up. Provide for a tub to collect spills. Unauthorized persons are not admitted. Meet the legal requirements.

Special rules on packaging: SPECIAL REQUIREMENTS: closing. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.
Packaging materials: SUITABLE MATERIAL: stainless steel, carbon steel, polyethylene, polypropylene, glass, stoneware/porcelain. MATERIAL TO AVOID: monel steel, lead, copper, zinc.

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Sulfuric Acid, ACS (7664-93-9)</th>
<th>ACGIH ACGIH TWA (mg/m³)</th>
<th>0.2 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA OSHA PEL (TWA) (mg/m³)</td>
<td>1 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

Materials for protective clothing: GIVE EXCELLENT RESISTANCE: butyl rubber, polyethylene, tetrafluoroethylene. GIVE LESS RESISTANCE: neoprene, PVC, viton. GIVE POOR RESISTANCE: natural rubber, nitrile rubber, PVA.

Hand protection: Gloves.
Eye protection: Face shield.
Skin and body protection: Corrosion-proof clothing.
Respiratory protection: Gas mask with filter type E at conc. in air > exposure limit.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Liquid</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>98.08 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Pure substance: colourless; Unpurified: yellow to brown</td>
</tr>
<tr>
<td>Odour</td>
<td>Almost odourless</td>
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<tr>
<td>Odour threshold</td>
<td>&gt; 1 mg/m³</td>
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<tr>
<td>pH</td>
<td>No data available</td>
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<td>Relative evaporation rate (butylacetate=1)</td>
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</tr>
<tr>
<td>Melting point</td>
<td>10 °C</td>
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<tr>
<td>Freezing point</td>
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<tr>
<td>Boiling point</td>
<td>288 °C</td>
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<tr>
<td>Flash point</td>
<td>Not applicable</td>
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<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
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<tr>
<td>Decomposition temperature</td>
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<tr>
<td>Flammability (solid, gas)</td>
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<tr>
<td>Vapour pressure</td>
<td>&lt; 1.0 hPa</td>
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<td>Relative vapour density at 20 °C</td>
<td>3.4</td>
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<tr>
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<tr>
<td>Density</td>
<td>1840 kg/m³</td>
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<tr>
<td>Solubility</td>
<td>Exothermically soluble in water. Soluble in ethanol. Water: Complete</td>
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<td>Log Pow</td>
<td>-2.20 (Estimated value)</td>
</tr>
<tr>
<td>Log Kow</td>
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<tr>
<td>Viscosity, kinematic</td>
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<tr>
<td>Viscosity, dynamic</td>
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<tr>
<td>Explosive properties</td>
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<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information

VOC content: Not applicable
Other properties: Gas/vapour heavier than air at 20°C. Clear. Hygroscopic. Slightly volatile. Substance has acid reaction.

SECTION 10: Stability and reactivity

10.1. Reactivity

Violent exothermic reaction with water (moisture): release of corrosive gases/vapours. Reacts on exposure to water (moisture) with (some) metals: release of highly flammable gases/vapours (hydrogen). On heating/burning: release of toxic and corrosive gases/vapours (sulphur oxides). Reacts violently with (some) bases: heat release resulting in increased fire or explosion risk. Reacts with many compounds e.g.: with (strong) reducers, with organic material and with combustible materials: (increased) risk of fire/explosion.

10.2. Chemical stability

Unstable on exposure to moisture.

10.3. Possibility of hazardous reactions

Reacts violently with water. Reacts violently with (some) bases: release of heat.

10.4. Conditions to avoid

Incompatible materials. Moisture.

10.5. Incompatible materials


10.6. Hazardous decomposition products

Sulfur compounds.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Not classified

Sulfuric Acid, ACS (7664-93-9)

LD50 oral rat: 2140 mg/kg bodyweight (Rat; Experimental value)

Skin corrosion/irritation: Causes severe skin burns and eye damage.

Serious eye damage/irritation: Causes serious eye damage.

Respiratory or skin sensitisation: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Additional information: Strong inorganic acid mists containing sulfuric acid are carcinogenic to humans

IARC group: 1 - Carcinogenic to humans

National Toxicology Program (NTP) Status: 2 - Known Human Carcinogens

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): Not classified

Specific target organ toxicity (repeated exposure): Not classified

Aspiration hazard: Not classified


Symptoms/injuries after skin contact: Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact: Corrosion of the eye tissue. Permanent eye damage.


SECTION 12: Ecological information

12.1. Toxicity

Ecology - general: Classification concerning the environment: not applicable.

Ecology - air: Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).
Ecology - water:

Sulfuric Acid, ACS (7664-93-9)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fishes 1</td>
<td>42 mg/l (96 h; Gambusia affinis)</td>
</tr>
<tr>
<td>EC50 Daphnia 1</td>
<td>29 mg/l (24 h; Daphnia magna)</td>
</tr>
<tr>
<td>LC50 fish 2</td>
<td>49 mg/l (48 h; Lepomis macrochirus)</td>
</tr>
<tr>
<td>TLM fish 1</td>
<td>42 mg/l (96 h; Gambusia affinis)</td>
</tr>
<tr>
<td>Threshold limit other aquatic organisms 1</td>
<td>6900 mg/l (24 h; Pseudomonas fluorescens)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

Sulfuric Acid, ACS (7664-93-9)

Persistence and degradability:
- Biodegradability: not applicable.
- Biochemical oxygen demand (BOD): Not applicable
- Chemical oxygen demand (COD): Not applicable
- ThOD: Not applicable
- BOD (% of ThOD): Not applicable

12.3. Bioaccumulative potential

Sulfuric Acid, ACS (7664-93-9)

Log Pow: -2.20 (Estimated value)

Bioaccumulative potential: Bioaccumulation: not applicable.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer:

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations:
- Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle/reuse. Remove for physico-chemical/biological treatment. Remove to an authorized dump (Class I). Treat using the best available techniques before discharge into drains or the aquatic environment. Use appropriate containment to avoid environmental contamination.

Additional information:
- LWCA (the Netherlands): KGA category 01. Hazardous waste according to Directive 2008/98/EC.

Ecology - waste materials:
- Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT
- Transport document description: UN1830 Sulfuric acid with more than 51 percent acid, 8, II
- UN-No.(DOT): UN1830
- DOT Proper Shipping Name: Sulfuric acid with more than 51 percent acid
- Department of Transportation (DOT) Hazard Classes: 8 - Class 8 - Corrosive material 49 CFR 173.136
- Hazard labels (DOT): 8 - Corrosive
Sulfuric Acid, ACS
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Packing group (DOT) : II - Medium Danger

DOT Special Provisions (49 CFR 172.102) : A3 - For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings.
A7 - Steel packagings must be corrosion-resistant or have protection against corrosion.
B3 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks and DOT 57 portable tanks are not authorized.
B83 - Bottom outlets are prohibited on tank car tanks transporting sulfuric acid in concentrations over 65.25 percent.
B84 - Packagings must be protected with non-metallic linings impervious to the lading or have a suitable corrosion allowance for sulfuric acid or spent sulfuric acid in concentration up to 65.25 percent.
IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
N34 - Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154
DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L
DOT Vessel Stowage Location : C - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel.
DOT Vessel Stowage Other : 14 - For metal drums, stowage permitted under deck on cargo vessels

Additional information
Other information : No supplementary information available.

ADR
Transport document description : UN 1830 Sulphuric acid, 8, II, (E)
Packing group (ADR) : II
Class (ADR) : 8 - Corrosive substances
Hazard identification number (Kemler No.) : 80
Classification code (ADR) : C1
Danger labels (ADR) : 8 - Corrosive substances

Orange plates

Tunnel restriction code : E

Transport by sea
UN-No. (IMDG) : 1830
Class (IMDG) : 8 - Corrosive substances
EmS-No. (1) : F-A

11/05/2014 EN (English) 7/9
SECTION 15: Regulatory information

15.1. US Federal regulations

**Sulfuric Acid, ACS (7664-93-9)**
- Listed on the United States TSCA (Toxic Substances Control Act) inventory
- Listed on United States SARA Section 313
- RQ (Reportable quantity, section 304 of EPA's List of Lists) : 1000 lb
- SARA Section 302 Threshold Planning Quantity (TPQ) 1000 lb
- SARA Section 311/312 Hazard Classes: Immediate (acute) health hazard

15.2. International regulations

**CANADA**

**Sulfuric Acid, ACS (7664-93-9)**
- WHMIS Classification Class E - Corrosive Material

**EU-Regulations**

Classification according to Regulation (EC) No. 1272/2008 [CLP]
- Skin Corr. 1A H314
- Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC or 1999/45/EC
- C; R35
- Full text of R-phrases: see section 16

15.2.2. National regulations

**Sulfuric Acid, ACS (7664-93-9)**
- Listed on IARC (International Agency for Research on Cancer)
- Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date : 11/01/2014

Full text of H-phrases: see section 16:

<table>
<thead>
<tr>
<th>NFPA health hazard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Dam. 1</td>
<td>Serious eye damage/eye irritation, Category 1</td>
</tr>
<tr>
<td>Skin Corr. 1A</td>
<td>Skin corrosion/irritation, Category 1A</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage</td>
</tr>
</tbody>
</table>

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.

NFPA specific hazard : W - Unusual reactivity with water. This indicates a potential hazard using water to fight a fire involving this material. When a compound is both water-reactive and an oxidizer, the W/bar symbol should go in this quadrant and the OX warning is placed immediately below the NFPA diamond.
<table>
<thead>
<tr>
<th>HMIS III Rating</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given</td>
</tr>
<tr>
<td>Flammability</td>
<td>0 Minimal Hazard</td>
</tr>
<tr>
<td>Physical</td>
<td>2 Moderate Hazard</td>
</tr>
<tr>
<td>Personal Protection</td>
<td>H</td>
</tr>
</tbody>
</table>

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.
Technical Bulletin

SURFONIC® N-95 Surfactant

GENERAL NAME
Nonoxynol-9

PRODUCT DESCRIPTION
SURFONIC N-95 surfactant is the 9.5-mole ethoxylate of nonylphenol. It is a water soluble, nonionic surface-active agent which is compatible with other nonionic surfactants and with most anionic and cationic surfactants.

APPLICATIONS
• wetting agents
• detergents
• penetrants
• solubilizing agents
• dispersants
• emulsifiers

SALES SPECIFICATIONS

<table>
<thead>
<tr>
<th>Property</th>
<th>Specifications</th>
<th>Test Method*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear and substantially free of suspended matter</td>
<td>ST-30.1</td>
</tr>
<tr>
<td>Cloud point, °C (1% aqueous)</td>
<td>52 - 56</td>
<td>ST-9.1, 5.2.1</td>
</tr>
<tr>
<td>Color, Pt-Co</td>
<td>100 max.</td>
<td>ST-30.12</td>
</tr>
<tr>
<td>pH, 1% in 10:6 IPA:H₂O</td>
<td>6.5 - 7.5</td>
<td>ST-31.36,F</td>
</tr>
<tr>
<td>Water, wt%</td>
<td>0.2 max.</td>
<td>ST-31.53,5</td>
</tr>
</tbody>
</table>

*Methods of Test are available from Huntsman Corporation upon request.

TYPICAL PROPERTIES

Chemical Properties
Molecular Weight (theoretical) 638
EO Content, wt% (theoretical) 65.5
HLB Value 13.1
Hydroxyl Number (theoretical) 88
Water Solubility Soluble

Physical Properties
Flash point, PMCC, °F 460
Flash point, PMCC, °C 238
Pour point, °F 40
Pour point, °C 4
Density, g/ml at 25°C (77°F) 1.055
Weight, lbs/US gal at 25°C (77°F) 8.79
Viscosity, kinematic
  cSt at 25°C (77°F) 278
  cSt at 37.8°C (100°F) 112
Vapor Pressure, Torr, 25°C (77°F) <1x10⁻⁵
Critical Micelle Concentration, ppm at 25°C 48
Surface Tension, dynes/cm, 0.10% at 25°C 30

Regulatory Information
DOT/TDG Classification Not Regulated
HMIS Code 1-1-0
CAS Number 9016-45-9
TSCA Inventory Yes
WHMIS Classification D2B
Canadian DSL Yes
TOXICITY AND SAFETY
For information on the toxicity and safe handling of this product, read the Material Safety Data Sheet prior to use of the product.

HANDLING AND STORAGE
SURFONIC N-95 surfactant may be satisfactorily stored in carbon steel tanks using steel pipes and pumps. Caution must be exercised, however, to keep the material in the anhydrous state to prevent severe corrosion to the carbon steel tank and related equipment. A drier on the breathing nozzle is recommended to help maintain anhydrous conditions in the storage tank.

For longer term color stability, it is recommended that the product be stored under an inert atmosphere. Solid sediment may form upon standing. There should be circulation in the storage vessel to keep solids suspended.

Low pressure steam coils in storage tanks and steam tracing of transfer lines should be provided in cases where low environmental temperatures may make pumping of the product difficult.

SHIPPING DATA
Product is available in tank cars, tank trucks and drums of 470 pounds (205 kilograms) net weight. Small samples are available by contacting our sample department at 1-800-662-0924.

BIODEGRADABILITY AND ENVIRONMENTAL SAFETY
SURFONIC® N-series surfactants and related products have been shown to undergo 90% to 100% loss of surface activity (primary biodegradation) under the Semi-continuous Activated Sludge Method and over 90% removal in sewage treatment plants.

Environmental concentrations of nonylphenol (NP) and ethoxylate (NPE) in a survey of rivers across the U.S. receiving treated or untreated wastewater are mostly (60-75%) below their detection limits (0.1 microgram/kg or ppb for NP, NPE₁, and NPE₂; 1.6 ppb for the aggregate of NPE₃₋₁₇). Highest levels found of NP, NPE₁, and NPE₂ were about 1 ppb, (about 15 ppb for NPE₃₋₁₇). These maximum observed levels are 1 to 2 orders of magnitude below known acute or chronic toxicity toward aquatic organisms.

We conclude from this and other published information that our SURFONIC® N-series products and other NPE are satisfactorily biodegraded when treated in conventional secondary treatment plants, and no persistence or accumulation of NPE or environmental harm due to NPE is occurring. Comparison of the toxicity threshold of the most hazardous metabolite of nonylphenol ethoxylates, nonylphenol, and its actual concentration in the environment demonstrates a sizable safety margin. Cleaning products containing NPE may be disposed of safely by flushing down the drain with water.

General References
SAFETY DATA SHEET

Therminol® VP1 Heat Transfer Fluid

SECTION 1. IDENTIFICATION

Product name : Therminol® VP1 Heat Transfer Fluid
Product code : 34152-00, P3415201, P3415204, P3415205, P3415203, P3415202, P3415200, E3415201

Manufacturer or supplier's details
Company name of supplier : Eastman Chemical Company
Address : 200 South Wilcox Drive
          Kingsport TN 37660-5280
Telephone : (423) 229-2000
Emergency telephone : CHEMTREC: +1-800-424-9300, +1-703-527-3887 CCN7321
For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

Recommended use of the chemical and restrictions on use
Recommended use : Heat transfer fluids
Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Acute toxicity (Inhalation) : Category 4
Skin irritation : Category 2
Specific target organ systemic toxicity - single exposure : Category 3 (Respiratory system)

GHS label elements
Hazard pictograms :

Signal Word : Warning
Hazard Statements : H315 Causes skin irritation.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.

Precautionary Statements : Prevention:
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves.

Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>diphenyl oxide</td>
<td>101-84-8</td>
<td>73.5</td>
</tr>
<tr>
<td></td>
<td>Biphenyl; diphenyl</td>
<td>92-52-4</td>
<td>26.5</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

If inhaled: Remove person to fresh air and keep comfortable for breathing.
If breathing is difficult, give oxygen.
Consult a physician if necessary.

In case of skin contact: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.
If skin irritation occurs: Get medical advice/ attention.
Wash contaminated clothing before reuse.

In case of eye contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
Get medical attention if symptoms occur.

If swallowed: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
Do NOT induce vomiting.
Rinse mouth.
Never give anything by mouth to an unconscious person.
Safety Data Sheet

Therminol® VP1 Heat Transfer Fluid

Most important symptoms and effects, both acute and delayed:
- Causes skin irritation.
- Harmful if inhaled.
- May cause respiratory irritation.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:
- Water spray
- Carbon dioxide (CO2)
- Dry chemical
- Foam

Unsuitable extinguishing media:
- Do not use a solid water stream as it may scatter and spread fire.

Hazardous combustion products:
- Hazardous decomposition products due to incomplete combustion
- Carbon oxides

Further information:
- Use a water spray to cool fully closed containers.
- Do not allow run-off from fire fighting to enter drains or water courses.
- This product is not classified as a fire-resistant heat transfer fluid. Precautions to avoid sources of ignitions should be taken.

Special protective equipment for fire-fighters:
- Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Ventilate the area.
- Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
- Avoid contact with skin and eyes.
- Material can create slippery conditions.
- Wear appropriate personal protective equipment.
- Local authorities should be advised if significant spillages cannot be contained.

Environmental precautions:
- Clear up spills immediately and dispose of waste safely.
- Avoid release to the environment.
- Collect spillage.

Methods and materials for containment and cleaning up:
- Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).
- Prevent runoff from entering drains, sewers, or streams.
SECTION 7. HANDLING AND STORAGE

Advice on safe handling:
- Do not breathe vapors or spray mist.
- Handle product only in closed system or provide appropriate exhaust ventilation at machinery.
- In case of insufficient ventilation, wear suitable respiratory equipment.
- Keep away from flames and sparks.
- Wear appropriate personal protective equipment.
- Avoid contact with skin, eyes and clothing.
- Wash thoroughly after handling.
- Wash contaminated clothing before reuse.
- Drain or remove substance from equipment prior to break-in or maintenance.
- Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage:
- Store locked up.
- Keep container tightly closed in a dry and well-ventilated place.
- Keep in a cool place away from oxidizing agents.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>diphenyl oxide</td>
<td>101-84-8</td>
<td>TWA (Vapor)</td>
<td>1 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL (Vapor)</td>
<td>2 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Vapor)</td>
<td>1 ppm</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 mg/m3</td>
<td></td>
</tr>
<tr>
<td>Biphenyl; diphenyl</td>
<td>92-52-4</td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 mg/m3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 mg/m3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>OSHA P0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 mg/m3</td>
<td></td>
</tr>
</tbody>
</table>

Engineering measures:
- 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.
Personal protective equipment

Respiratory protection: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. 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.

Hand protection

Remarks: Wear suitable gloves. When handling hot material, use heat resistant gloves.

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

Skin and body protection: Wear suitable protective clothing.

Protective measures: Ensure that eye flushing systems and safety showers are located close to the working place.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid

Color: colorless

Odor: characteristic

Melting point/range: 12 °C

Boiling point/boiling range: 257 °C (1,013 hPa)

Flash point: 110 °C
Method: Pensky-Martens closed cup

124 °C
Method: Cleveland open cup

Relative density: 1.06 (25 °C)

Density: 1.060 kg/m³ (25 °C)

Solubility(ies)
Water solubility: 0.025 g/l
**SECTION 10. STABILITY AND REACTIVITY**

**Reactivity:** None reasonably foreseeable.

**Chemical stability:** Stable under normal conditions.

**Possibility of hazardous reactions:** None known.

**Conditions to avoid:** Heating in air. Keep away from flames and sparks.

**Incompatible materials:** Strong oxidizing agents

**Hazardous decomposition products:** Emits acrid smoke and fumes when heated to decomposition.

**SECTION 11. TOXICOLOGICAL INFORMATION**

**Acute toxicity**
Harmful if inhaled.

**Product:**

**Acute oral toxicity:** LD50 Oral (Rat): 2,050 mg/kg
Assessment: May be harmful if swallowed.

**Acute inhalation toxicity:** LC50 (Rat, Male and Female): 2.66 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: Harmful if inhaled.

**Acute dermal toxicity:** LD50 Dermal (Rabbit): > 5,010 mg/kg
Assessment: Not classified

**Ingredients:**

**diphenyl oxide:**

**Acute oral toxicity:** LD50 Oral (Rat, female): 2,830 mg/kg
Assessment: May be harmful if swallowed.
Acute inhalation toxicity: LC50: Remarks: No data available

Acute dermal toxicity: LD50 Dermal (Rabbit, Male and Female): > 7,940 mg/kg
Assessment: Not classified

Biphenyl; diphenyl:
Acute oral toxicity: LD50 Oral (Rat, male): > 2,180 mg/kg
Assessment: The component/mixture is low toxic after single ingestion.

Acute inhalation toxicity: LC50 (Rat, male and female): > 3.47 mg/l
Exposure time: 1 h
Assessment: The substance or mixture has no acute inhalation toxicity

Skin corrosion/irritation
Causes skin irritation.

Product:
Species: Rabbit
Exposure time: 24 h
Assessment: Causes skin irritation.
Result: slight

Ingredients:
diphenyl oxide:
Species: Rabbit
Exposure time: 4 h
Result: none

Biphenyl; diphenyl:
Species: Rabbit
Result: slight

Species: Humans
Assessment: Irritating to skin.
Result: strong

Serious eye damage/eye irritation
Not classified based on available information.

Product:
Species: Rabbit
Result: No eye irritation
Exposure time: 24 h
Assessment: Not classified

Ingredients:
diphenyl oxide:
Species: Rabbit
Result: corneal opacity
Exposure time: 4 h
Assessment: irritating

Result: slight to moderate

**Biphenyl; diphenyl:**
Species: Rabbit
Result: slight irritation

Species: Humans
Result: strong
Assessment: Irritating to eyes.

**Respiratory or skin sensitization**
Skin sensitization: Not classified based on available information.
Respiratory sensitization: Not classified based on available information.

**Ingredients:**

**diphenyl oxide:**
Test Type: Skin Sensitization
Species: Guinea pig
Assessment: Not classified
Method: OECD 406: Guinea pig sensitization
Result: non-sensitizing

Test Type: Human experience
Species: Humans
Assessment: Not classified
Method: Human Repeat Insult Patch Test
Result: non-sensitizing

**Biphenyl; diphenyl:**
Test Type: OECD 406: Guinea pig sensitization
Species: Guinea pig
Assessment: Not classified
Result: Does not cause skin sensitization.

**Germ cell mutagenicity**
Not classified based on available information.

**Product:**

Genotoxicity in vitro: Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Genotoxicity in vitro: Test Type: Chromosome aberration test in vitro
Metabolic activation: +/- activation
Method: In vitro Mammalian Chromosome Aberration Test
Result: negative

Genotoxicity in vivo: Test Type: Mammalian Erythrocyte Micronucleus Test
Species: Mouse  
Method: Mammalian Erythrocyte Micronucleus Test  
Result: negative

**Ingredients:**  
**diphenyl oxide:**  
Genotoxicity in vitro  
: Test Type: Salmonella typhimurium assay (Ames test)  
Metabolic activation: +/- activation  
Method: Bacterial Reverse Mutation Assay  
Result: negative

: Test Type: Mutagenicity - Mammalian  
Metabolic activation: +/- activation  
Method: In vitro Mammalian Cell Gene Mutation Test  
Result: negative

: Test Type: Mutagenicity - Mammalian  
Metabolic activation: +/- activation  
Method: In vitro Mammalian Chromosome Aberration Test  
Result: negative

: Test Type: Mutagenicity - Mammalian  
Metabolic activation: +/- activation  
Method: OECD Guideline 482  
Result: negative

**Biphenyl; diphenyl:**  
Genotoxicity in vitro  
: Test Type: Salmonella typhimurium assay (Ames test)  
Metabolic activation: +/- activation  
Method: Bacterial Reverse Mutation Assay  
Result: negative

: Test Type: Mutagenicity - Mammalian  
Metabolic activation: + activation  
Method: In vitro Mammalian Cell Gene Mutation Test  
Result: positive

: Test Type: Chromosome aberration test in vitro  
Metabolic activation: +/- activation  
Method: In vitro Mammalian Chromosome Aberration Test  
Result: negative

: Test Type: Mutagenicity - Mammalian  
Method: OECD Guideline 482  
Result: negative

Genotoxicity in vivo  
: Species: Mouse (Male and Female)  
Method: Mammalian Erythrocyte Micronucleus Test  
Result: negative

Species: Rat (male)  
Method: Mammalian Bone Marrow Chromosome Aberration Test
Result: negative

Carcinogenicity
Not classified based on available information.

**Ingredients:**
**Biphenyl; diphenyl:**
Species: Rat, (male and female)
Application Route: Ingestion
Method: OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies
Remarks: Expert judgment
Not classified

IARC
No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.

**Product:**
Effects on fetal development: Species: Rat
Application Route: oral (gavage)
500 mg/kg
< 50 mg/l
Method: OECD Test No. 414: Prenatal Developmental Toxicity Study
Remarks: Based on available data, the classification criteria are not met.

**Ingredients:**
**diphenyl oxide:**
Effects on fertility: No known significant effects or critical hazards.

Effects on fetal development: Species: Rat
Application Route: oral (gavage)
500 mg/l
> 50 mg/kg
Method: OECD Test No. 414: Prenatal Developmental Toxicity Study
Remarks: Read-across from a similar material
Reproductive toxicity - Assessment: Based on available data the classification criteria are not met. Not classified as hazardous.

**Biphenyl; diphenyl:**
Effects on fertility:
Species: Rat
Sex: male and female
Application Route: Ingestion
NOAEL: 40 mg/kg,
F1: 40 mg/kg,
F2: 40 mg/kg,
Remarks: There is no evidence to indicate potential for adverse reproductive effects in humans.

Effects on fetal development:
Species: Rat
Application Route: oral (gavage)
500 mg/kg
Method: OECD Test No. 414: Prenatal Developmental Toxicity Study

Reproductive toxicity - Assessment: Based on available data the classification criteria are not met. Not classified as hazardous.

**STOT-single exposure**
May cause respiratory irritation.

**Product:**
Routes of exposure: Inhalation
Assessment: Irritating to respiratory system.

**Ingredients:**
**diphenyl oxide:**
Routes of exposure: Inhalation
Assessment: Based on available data, the classification criteria are not met.

**Biphenyl; diphenyl:**
Routes of exposure: Inhalation
Target Organs: Respiratory system
Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

**STOT-repeated exposure**
Not classified based on available information.

**Product:**
Routes of exposure: Oral
Assessment: Not classified

**Ingredients:**
**diphenyl oxide:**
Assessment: Based on available data, the classification criteria are not met.
Biphenyl; diphenyl:
Target Organs: Kidney, Liver, Urinary bladder
Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Product:
Species: Rat, Male and Female
NOAEC: 0.051 mg/l
Application Route: Inhalation study
Exposure time: 90 days

Species: Rat
LOAEL (Lowest observed adverse effect level): 500 mg/l
Application Route: by gavage

Ingredients:
diphenyl oxide:
Species: Rat, male and female
NOAEL (No observed adverse effect level): 301 mg/kg
Application Route: Oral Study
Exposure time: 90 days
Remarks: (highest dose tested)

Species: Rat, male and female
NOAEL (No observed adverse effect level): 1000 mg/kg
Application Route: Dermal Study
Exposure time: 90 days
Remarks: (highest dose tested)

Species: Rat, male and female
NOAEL: 139 mg/m3
Application Route: inhalation (vapor)
Exposure time: 28 days
Remarks: (highest dose tested)

Biphenyl; diphenyl:
Species: Rat, male and female
NOAEL: 39 mg/kg
Application Route: in feed
Exposure time: 2 year
Method: OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies
Target Organs: Blood, Kidney, Liver

Species: Rabbit
NOAEL: > 2,000 mg/kg
Application Route: Dermal
Exposure time: 28 days
Remarks: No significant adverse effects were reported
Aspiration toxicity
Not classified based on available information.

Product: Not classified

Information on likely routes of exposure

Product:
Inhalation : Remarks: Harmful if inhaled.  
May cause respiratory irritation.

Skin contact : Remarks: Causes skin irritation.

Eye contact : Remarks: None known.

Ingestion : Remarks: May be harmful if swallowed.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:
Toxicity to fish : LC50 (Onchorhynchus mykiss (rainbow trout)): 7.6 mg/l 
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 2.4 mg/l 
Exposure time: 48 h

Toxicity to algae : EC50 (Selenastrum capricornutum (green algae)): 1.3 mg/l 
Exposure time: 72 h

Ingredients:
diphenyl oxide:
Toxicity to fish : LC50 (Onchorhynchus mykiss (rainbow trout)): 4.2 mg/l 
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 1.7 mg/l 
Exposure time: 48 h

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (algae)): 2.5 mg/l 
Exposure time: 72 h

Biphenyl; diphenyl:
Toxicity to fish : EC50 (Pimephales promelas (fathead minnow)): 3 mg/l 
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.36 mg/l 
Exposure time: 48 h

Toxicity to algae : EC50 (Chlorella pyrenoidosa): 1.3 mg/l
**Exposure time:** 72 h

NOEC (Chlorella pyrenoidosa): 0.66 mg/l
Exposure time: 72 h

M-Factor (Acute aquatic toxicity): 1

**Toxicity to fish (Chronic toxicity):** NOEC (Oncorhynchus mykiss (rainbow trout)): 0.229 mg/l
Exposure time: 96 d

**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):** NOEC (Daphnia magna (Water flea)): 0.17 mg/l
Exposure time: 21 d

M-Factor (Chronic aquatic toxicity): 1

**Persistence and degradability**

**Product:**

**Biodegradability:** Result: Inherently biodegradable.
Method: Inherent Biodegradability: Modified SCAS Test

Biochemical Oxygen Demand (BOD): Remarks: No data available

Chemical Oxygen Demand (COD): Remarks: No data available

BOD/COD: Remarks: No data available

**Ingredients:**

**diphenyl oxide:**

**Biodegradability:** Result: Readily biodegradable.
Method: Ready Biodegradability: Modified MITI Test (I)

Biochemical Oxygen Demand (BOD): Remarks: No data available

Chemical Oxygen Demand (COD): Remarks: No data available

**Bioaccumulative potential**

**Ingredients:**

**diphenyl oxide:**

Bioaccumulation: Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 49 - 594  
Method: OECD Test Guideline 305

Species: Oncorhynchus mykiss (rainbow trout)  
Bioconcentration factor (BCF): 196

Biphenyl; diphenyl:  
Bioaccumulation : Bioconcentration factor (BCF): 1,900

Mobility in soil

Ingredients:  
diphenyl oxide:  
Distribution among environmental compartments : Koc: 1960, log Koc: 3.3

Biphenyl; diphenyl:  
Distribution among environmental compartments : Medium: Soil  
Koc: 1546, log Koc: 3.19  
Method: OECD Test No. 106: Adsorption - Desorption Using a Batch Equilibrium Method

Other adverse effects  
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods  
Waste from residues : Dispose of in accordance with local regulations.

This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24, due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311 for the compound D018 BENZENE. Consult 40 CFR 268.40 or appropriate local regulations for concentration based standards. This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards. Eastman Chemical Company operates a used fluid return program for certain fluids under these used oil standards. Contact your Sales Representative for details.
SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR
UN/ID No.: UN 3082
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Diphenyl Ether, biphenyl)

Class: 9
Packing group: III
Labels: Miscellaneous
Packing instruction (cargo aircraft): 964
Packing instruction (passenger aircraft): 964

IMDG-Code
UN number: UN 3082
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Diphenyl Ether, biphenyl)

Class: 9
Packing group: III
Labels: Class 9 - Miscellaneous Dangerous Goods
EmS Code: F-A, S-F
Marine pollutant: yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation

49 CFR
UN/ID/NA number: UN 3082
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (biphenyl)

Class: 9
Packing group: III
Labels: Class 9 - Miscellaneous Dangerous Goods
ERG Code: 171
Marine pollutant: yes (diphenyl)
Remarks: Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity
SAFETY DATA SHEET

Therminol® VP1 Heat Transfer Fluid

Version 1.1  Revision Date: 04/20/2017  SDS Number: 150000093459  Date of last issue: -  Date of first issue: 09/06/2016

SDSUS / PRD / 0001

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>biphenyl</td>
<td>92-52-4</td>
<td>100</td>
<td>377.36</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards:  Acute Health Hazard

SARA 302:  No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313:  The following components are subject to reporting levels established by SARA Title III, Section 313:

Biphenyl; diphenyl  92-52-4  26.5 %

The ingredients of this product are reported in the following inventories:

DSL:  On the inventory, or in compliance with the inventory
AICS:  On the inventory, or in compliance with the inventory
ENCS:  On the inventory, or in compliance with the inventory
ISHL:  On the inventory, or in compliance with the inventory
KECI:  On the inventory, or in compliance with the inventory
PICCS:  On the inventory, or in compliance with the inventory
IECSC:  On the inventory, or in compliance with the inventory
TSCA:  On the inventory, or in compliance with the inventory

TSCA list
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC -
International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

**NFPA:**

- **Flammability:**
  - Health: 2
  - Flammability: 1
- **Instability:**
  - Special hazard.

**HMIS® IV:**

- **HEALTH**
  - / 2
- **FLAMMABILITY**
  - 1
- **PHYSICAL HAZARD**
  - 0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks.

Sources of key data used to compile the Material Safety Data Sheet

Revision Date: 04/20/2017

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION:

MANUFACTURER: Griffin Bros., Inc.
P.O. Box 7719
Salem, OR 97303

INFORMATION: (800) 456-4743

EMERGENCY PHONE: CHEMTEC: (800) 424-9300

PRODUCT NAME: Trisodium Phosphate
PRODUCT NUMBER: G-531
DATE PREPARED: 03/03/2015
LAST REVISION: 07/18/2015

2. HAZARDOUS IDENTIFICATION:

EMERGENCY OVERVIEW: Corrosive

GHS CLASSIFICATION: Skin: (Category 2), Eyes: (Category 2A), STOT - Single Exposure (Category 3) Respiratory

GHS Label elements, including precautionary statements

SIGNAL WORD: Warning
PICTOGRAM:

HAZARD STATEMENT(S):

H315: Causes skin irritation
H319: Causes serious eye irritation
H335: May cause respiratory irritation

PRECAUTIONARY STATEMENT(S):

P261: Avoid breathing spray, mist, fume, gas, dust, vapours
P280: Wear protective gloves, protective clothing, eye protection, face protection
P302+P352: IF ON SKIN: Wash with plenty of hands, forearms and face
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

3. COMPOSITION/INFORMATION ON INGREDIENTS:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>Wt. Range %</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRISODIUM PHOSPHATE</td>
<td>10101-89-0</td>
<td>&gt;= 98.5</td>
</tr>
<tr>
<td>Balance of formula is Proprietary Non-hazardous materials</td>
<td>-</td>
<td>Balance</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES:

GENERAL ADVICE: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

EYE CONTACT: Immediately flush eyes with water for at least 15 minutes. Hold eyelids open while flushing the eyes.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

INGESTION: Do NOT induce vomiting. Give victim lots of water or milk. Get medical attention immediately.

SKIN CONTACT: Wash with soap and water. Change contaminated clothing. Get medical attention if irritation develops or persists.

AGGRAVATED MEDICAL CONDITIONS: Pre-existing eye, skin or respiratory conditions.

SUPPLEMENTAL HEALTH INFORMATION: The effects of long-term, low-level exposure to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the avoidance of all effects from repetitive acute exposures.

5. FIRE FIGHTING MEASURES:

EXTINGUISHING MEDIA: Use extinguishing media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece in positive pressure mode. Move containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

COMBUSTION PRODUCTS: None known.

6. ACCIDENTAL RELEASE MEASURES:

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED: Pick up and arrange disposal without creating dust. Sweep up and shovel. DO NOT add water to spilled material. DO NOT use floor sweeping compounds to clean up spills. Every attempt should be made to avoid mixing spilled material with other chemicals or debris when cleaning up. Keep in suitable, closed containers for disposal.

Page 1 of 3  G-531  TSP  Trisodium Phosphate
7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Do not handle until all safety precautions have been read and understood. Do not allow product to get wet. If liner is present, tie after each use. Use good personal hygiene when handling this product. Wash hands after use, before smoking, or using the toilet. Wear personal protection as required per safety program. Follow all SDS/label precautions even after container is emptied because it may retain product residues.

OTHER PRECAUTIONS: For industrial and institutional use only. Keep away from children. Keep containers closed while not in use.

8. EXPOSURE CONTROL/PERSONAL PROTECTION:

EXPOSURE CONTROLS:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>OSHA PEL TWA</th>
<th>STEL</th>
<th>ACGIH TLV TWA</th>
<th>STEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRISODIUM PHOSPHATE</td>
<td>Respirable: 5 mg/m³. Inhalable: 15mg/m³</td>
<td></td>
<td>Respirable: 3 mg/m³. Inhalable: 10 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION: Use respiratory protection mask according to NIOSH/MSHA. Respiratory protection programs must comply with 29 CFR 1910.134.

VENTILATION: Local exhaust sufficient to keep exposure below TLV.

WORK/HYGIENIC PRACTICES: Use good personal hygiene when handling this product. Wash hands after use, before smoking, or using the toilet.

EYE PROTECTION: Use chemical safety goggles and/or full face shield when splashing is possible. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work areas.

PROTECTIVE GLOVES: Rubber, Neoprene, Nitrile, Polyvinyl chloride (PVC). Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

OTHER PROTECTIVE EQUIP: Boots, apron, lab coat or coveralls of impervious material, as appropriate to avoid skin contact.

ENGINEERING CONTROLS: Facilities storing or utilizing this material should be equipped with an eye wash facility and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES:

INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White granular powder</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>pH at 20 °C</td>
<td>11.7 - 12.5</td>
</tr>
<tr>
<td>Boiling range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity</td>
<td>n/a</td>
</tr>
<tr>
<td>Flash point</td>
<td>n/a</td>
</tr>
<tr>
<td>Auto-Ignition temperature</td>
<td>n/a</td>
</tr>
<tr>
<td>Water solubility</td>
<td>21 g / 100 g saturated solution @ 25 °C</td>
</tr>
</tbody>
</table>

10. STABILITY AND-reactivity:

STABLE: Stable under recommended storage conditions.

INCOMPATIBILITY: Take care when using on aluminum. This material could be corrosive to aluminum surfaces because of the high pH.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: oxides of carbon

HAZARDOUS POLYMERIZATION: Will Not Occur

CONDITIONS TO AVOID: Do not get water/moisture inside container, product is hygroscopic. Avoid contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION:

Laboratory data

Data from ICL Performance LP single-dose (acute) animal studies with this material are given below:

- **ORAL – RAT L50:** 6,500 mg/kg; practically non-toxic
- **DERMAL – RABBIT L50:** >7940 mg/kg; practically non-toxic
- **EYE IRRITATION – RABBIT (4-HR EXP.):** corrosive
- **SKIN IRRITATION – RABBIT:** 3.3 / 8.0; moderately irritating

The anhydrous form of this material produced no mutagenic effects in standard assays using fruit flies.

This material has been defined as a hazardous chemical under criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

12. ECOLOGICAL INFORMATION:

The following data have been classified using criteria adopted by the European Economic Community (ECC) for aquatic organism toxicity.

- **INVERTEBRATE:** 48-hr EC50 Daphnia magna: >1000 mg/L; Practically Non-toxic
- **WARMWATER FISH:** 96-hr LC50 Bluegill sunfish: 440 mg/L; Practically Non-toxic
- **COLDWATER FISH:** 96-hr LC50 Rainbow Trout: 260 mg/L; Practically Non-toxic

13. DISPOSAL CONSIDERATIONS: This material when discarded in pure form is not a hazardous waste as defined by 40 CFR 261, the Resource Conservation and Recovery Act (RCRA). Dry materials may be landfilled or recycled in accordance with local, state, and federal regulations. If materials have become contaminated with other substances, dispose of in accordance with local, state, and federal regulations.
14. TRANSPORT INFORMATION:

<table>
<thead>
<tr>
<th>Regulation</th>
<th>UN No.</th>
<th>Proper Shipping Name</th>
<th>Transport Hazard Class(es)</th>
<th>Packing Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>US DOT</td>
<td>-</td>
<td>Non-Regulated Material, Solid</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ERG No.:</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION: No data available

16. OTHER INFORMATION:

HMIS INFORMATION: HEALTH: 1 FLAMMABILITY: 0 PHYSICAL HAZARD: 0 PROTECTIVE: B
NFPA INFORMATION: TOXICITY: 1 FIRE: 0 REACTIVITY: 0 SPECIAL: N

Griffin Bros., Inc. expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein. All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information appears to be accurate, Griffin Bros., Inc. makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Griffin Bros., Inc.'s control and therefore users are responsible to verify this data under their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publications of use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.
1. Company and Product Identification

1.1 Identification – Product Name: Vitec© 4000

1.2 Other means of identification

1.3 Synonym: Organic Acid, terpolymer

1.4 Recommended Use Of The Chemical and Restrictions On Use:

   Name, Address, And Telephone Number Of The Manufacturer, Or Other Responsible Party:

   AVISTA TECHNOLOGIES
   140 Bosstick Street
   San Marcos, CA  92069
   (760) 744-0536
   klindsey@avistatech.com

   24 Hour Emergency No.:

   1-800-424-9300 (United States)
   1-202-483-7616 (International Collect)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is amber to light yellow water-based solution with a mild odor. This product may irritate contaminated tissue. This product is neither reactive nor flammable. Emergency responders must wear personal protective equipment and have appropriate fire-extinguishing protection) suitable for the situation to which they are responding.

Physical Hazards Summary None

Potential Health Hazards Summary

   Acute Oral Toxicity, category 4
   Skin irritation, category 2B
   Eye irritation category 2 B
   STOT repeated exposure category 2

Potential Ecological Effects Summary None

2.1 Classification Of Product

   U.S. OSHA classification

   Skin, eye irritant

   Classification as per EC 1272/2008 (CLP/GHS)

   Acute Oral Toxicity, category 4
   Skin irritation, category 2B
   Eye irritation category 2 B
   STOT repeated exposure category 2
   Xn Harmful

   WHMIS classification

   E, corrosive
2.2 Label Elements OSHA/GHS

<table>
<thead>
<tr>
<th>General Warnings</th>
<th>P101</th>
<th>If medical advice is needed, have product container or label at hand.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P102</td>
<td>Keep out of reach of children.</td>
</tr>
<tr>
<td></td>
<td>P103</td>
<td>Read label before use</td>
</tr>
</tbody>
</table>

Signal Word: WARNING!

<table>
<thead>
<tr>
<th>Hazard statements</th>
<th>H302</th>
<th>Harmful if swallowed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H312</td>
<td>Harmful in contact with skin</td>
</tr>
<tr>
<td></td>
<td>H315 + H320</td>
<td>Causes skin or eye irritation</td>
</tr>
</tbody>
</table>

Precautionary statements

<table>
<thead>
<tr>
<th>P271</th>
<th>Use only outdoors or in a well-ventilated area.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P281</td>
<td>Use personal protective equipment as required.</td>
</tr>
<tr>
<td>P311</td>
<td>IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.</td>
</tr>
<tr>
<td>P302/P352</td>
<td>IF ON SKIN: Wash with plenty of soap and water.</td>
</tr>
<tr>
<td>P337 + P313</td>
<td>IF EYE IRRITATION PERSISTS: Get medical advice/attention. Store in a closed container.</td>
</tr>
</tbody>
</table>

2.3 Unclassified Hazards

None

2.4 Ingredients with unknown acute toxicity

None

3. COMPOSITION and INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>% w/w</th>
<th>US OSHA</th>
<th>GHS/EU CLP</th>
<th>WHMIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic Polymer</td>
<td>10-20</td>
<td>Low Hazard Low</td>
<td>Unknown</td>
<td>Not classified</td>
</tr>
<tr>
<td>Chelate Agent</td>
<td>1-10</td>
<td>Corrosive</td>
<td>Acute Oral Toxicity, category 4</td>
<td>E, corrosive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin irritation, category 2B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye irritation category 2 B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT repeated exposure category 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>/Xn Harmful: R 22-36-38; S2-13-24-25-26-36-46</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Keep out of reach of children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Keep away from food, drink and animal</td>
<td></td>
</tr>
</tbody>
</table>
feeding stuffs. Avoid contact with skin. Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing. If swallowed, seek medical advice immediately and show this container or label.

Water or other chemicals do not contribute to any additional hazards of this product.

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.

4. FIRST-AID MEASURES

4.1 Description of Necessary Measures

Skin exposure: If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim should seek immediate medical attention if any adverse exposure symptoms develop.

Eye exposure: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek medical attention.

Inhalation: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

Ingestion: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING. Have victim rinse mouth with water, if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention.

4.2 Most Important Symptoms/Effects:

Immediate: Inhalation exposure may cause coughing or sneezing. Symptoms of skin and eye contact may include redness and irritation. Ingestion may cause stomach pains, cramps, and gastritis.

Delayed: Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Symptoms may include tingling, redness, and visible injury.

4.3 Indication Of Immediate Medical Attention And Special Treatment Needed, If Necessary:

TARGET ORGANS: Acute: Skin, eyes. Chronic: Skin.

Victims of chemical exposure must be taken for medical attention if any adverse effects occur. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to physician or health professional with victim.
5. FIRE-FIGHTING MEASURES

Flammable properties Non-flammable aqueous solution

<table>
<thead>
<tr>
<th>NFPA FLAMMABILITY</th>
<th>HEALTH</th>
<th>REACTIVITY</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>See Section 16 for definitions of ratings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flash Point °C (°F): Not applicable.
Autoignition Temperature °C (°F): Not applicable.
Flammable Limits (in air by volume, %):
  - Upper: Not applicable.
  - Lower: Not applicable.

5.1 Suitable And Unsuitable Extinguishing Media:

This material will not contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire.

<table>
<thead>
<tr>
<th>Media</th>
<th>Suitable</th>
<th>Unsuitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water spray</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Foam</td>
<td>YES</td>
<td>Other</td>
</tr>
<tr>
<td>Dry chemical</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Halon</td>
<td>YES</td>
<td>Other</td>
</tr>
<tr>
<td>Other</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

5.2 Specific Hazards Arising From Chemical:

When involved in a fire, this material may decompose and produce irritating fumes and toxic gases (e.g., carbon monoxide, carbon dioxide, and phosphorus oxides).

Explosion Sensitivity to Mechanical Impact: Not applicable.
Explosion Sensitivity to Static Discharge: Not applicable.

5.3 Special Protective Equipment And Precautions For Fire-Fighters:

Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions

Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people.

Protective equipment

For small releases (< 5 gallons), clean up spilled liquid wearing gloves, goggles, face shield, and compatible body protection. The minimum Personal Protective Equipment recommended for response to non-incident releases (more than 5 gallons) should be Level B: triple-gloves (neoprene gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus.

Emergency procedures

Monitoring must indicate that exposure levels are below those provided in Section 3 (Composition and Information on Ingredients) and that oxygen levels are above 19.5% before anyone is permitted in the area without Self-Contained Breathing Apparatus.

6.2 Methods and Materials for Containment and Cleaning Up

Soak up or wet vacuum spilled liquid. Neutralize residue with sodium bicarbonate or other neutralizing agent for dilute acids. Decontaminate the area thoroughly. Test area with litmus paper to ensure neutralization. Place all spill residues in a suitable container. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate local standards (see Section 13, Disposal Considerations).
7. HANDLING and STORAGE

7.1 Precautions for Safe Handling

All employees who handle this material should be trained to handle it safely. Open containers carefully on a stable surface. Empty containers may contain residual liquid; therefore, empty containers should be handled with care.

As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid generating mists and sprays of this product. Remove contaminated clothing immediately.

During equipment maintenance follow practices indicated in Section 6 (Accidental Release Measures) to decontaminate equipment or clean-up small spills. Make certain that application equipment is locked and tagged-out safely if necessary. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or appropriate local standards.

7.2 Conditions For Safe Storage

Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials. Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Keep container tightly closed when not in use. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

Incompatibilities

Strong bases, amines, strong oxidizers, very strong acids, water reactive materials. It may react with metals to generate hydrogen gas. The product may release toxic gases if in contact with sulfides or sulfites.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

8.1 Control Parameters

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>ACGIH-TLV TWA</th>
<th>OSHA-PEL TWA</th>
<th>STEL</th>
<th>STEL</th>
<th>IDLH</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mg/m³</td>
<td>mg/m³</td>
<td></td>
<td></td>
<td>mg/m³</td>
<td>mg/m³</td>
</tr>
<tr>
<td>Acrylic Polymer</td>
<td>Proprietary</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Chelate compound</td>
<td>Proprietary</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.

8.2 Appropriate Engineering Controls.

Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in this Section or as low as reasonably achievable. Ensure eyewash/safety shower stations are available near areas where this product is used.

8.3 Personal Protective Equipment

Respiratory protection: None needed under normal conditions of use. Use NIOSH approved respirators if ventilation is inadequate to control mists or vapor. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the applicable local standards. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-face piece pressure/demand SCBA or a full-face piece, supplied air respirator with auxiliary self-contained air supply is required under OSHA’s Respiratory Protection Standard (1910.134-1998).

Eye protection: Use approved safety goggles or safety glasses, as described in OSHA 29 CFR 1910.133. Splash goggles with a faceshield may be needed if splash hazards exist.

Hand protection: Wear chemical impervious gloves (e.g., Solvex™, Neoprene).

Body protection: If needed, use body protection appropriate for task (e.g., Tyvek suit, rubber apron) to protect from splashes and sprays.
9. PHYSICAL and CHEMICAL PROPERTIES

**Appearance**
This product is amber to light yellow water-based solution with a mild odor.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>Odor Threshold</td>
</tr>
<tr>
<td>Melting Point °C (°F)</td>
<td>N/A</td>
</tr>
<tr>
<td>Initial Boiling Point °C (°F)</td>
<td>100</td>
</tr>
<tr>
<td>Flammability</td>
<td>Non-flammable</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>Similar to water</td>
</tr>
<tr>
<td>Solubility (in water)</td>
<td>Soluble</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Similar to water</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>N/A</td>
</tr>
<tr>
<td>How To Detect This Substance</td>
<td>The color and odor may act as warning properties associated with this product.</td>
</tr>
</tbody>
</table>

10. STABILITY and REACTIVITY

10.1 Reactivity
Not considered reactive.

10.2 Chemical Stability
Stable

10.3 Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4 Conditions to avoid
Avoid mixing with incompatible materials.

10.5 Incompatible Materials
Strong bases, amines, strong oxidizers, very strong acids, water reactive materials. It may react with metals to generate hydrogen gas. The product may release toxic gases if in contact with sulfides or sulfites.

10.6 Hazardous Decomposition Products
Thermal decomposition of this product may generate carbon monoxide, carbon dioxide, and phosphorus oxides.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

<table>
<thead>
<tr>
<th>Toxicity data for hazardous ingredients</th>
<th>Oral LD₅₀ mg/kg</th>
<th>Dermal LD₅₀ mg/kg</th>
<th>Inhalation LD₅₀ mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic Polymer</td>
<td>LD₅₀ (oral, rat) &gt; 5000 mg/kg</td>
<td>LD₅₀ (dermal, rabbit) &gt; 2000 mg/kg</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Eye irritation-rabbit: inconsequential irritation</td>
<td>Skin irritation-rabbit: practically non-irritating</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chelate compound</th>
<th>LD₅₀ (oral, mouse) = 1800 mg/kg</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TDLo (intraperitoneal, mouse) = 200 mg/kg/female 7 days post; Teratogenic effects</td>
<td>TDLo (intraperitoneal, mouse) = 40 mg/kg/female 7 days post; Reproductive effects</td>
<td>TDLo (subcutaneous, mouse) = 200 mg/kg/female 13 days after conception; Reproductive: Specific Developmental Abnormalities; musculoskeletal system</td>
</tr>
<tr>
<td></td>
<td>TDLo (subcutaneous, mouse) = 1400 mg/kg/female 11-17 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g. stunted fetus), Specific Developmental Abnormalities: Abnormalities: musculoskeletal system.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Potential routes of exposure
Inhalation, skin contact, eye contact

Potential effects of acute over-exposure
Inhalation exposure may cause tingling, coughing, sneezing, and difficulty breathing. Symptoms of skin and eye contact may include redness and irritation. Ingestion may cause stomach pains, cramps, and gastritis.

Potential effects of chronic over-exposure
Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Symptoms may include tingling, redness, and visible injury.

Symptoms of over-exposure
Immediate: Inhalation exposure may cause tingling, coughing, sneezing, and difficulty breathing. Symptoms of skin and eye contact may include redness and irritation.
### 12. ECOLOGICAL INFORMATION

**ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.**

<table>
<thead>
<tr>
<th>12.1</th>
<th>Ecotoxicity</th>
<th>( LC_{50}, \text{mg/L} )</th>
<th>( EC_{50}, \text{mg/L} )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACRYLIC POLYMER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic</td>
<td>( LC_{50} (\text{Salmo gairdneri}) \geq 1100 \text{ mg/L/96 hours} )</td>
<td>( EC_{50} (\text{algae}) = 72.4 \text{ mg/L/72 hours} )</td>
<td>( EC_{50} (\text{Daphnia magna}) &gt; 1040 \text{ mg/L/48 hours} )</td>
</tr>
<tr>
<td>Terrestrial</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>CHELATE COMPOUND</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic</td>
<td>( LC_{50} (\text{freshwater fish}) \geq 1000 \text{ mg/L} ) ( LC_{50} (\text{Rainbow trout, 48 h}) \geq 3440 \text{ mg/L} )</td>
<td>( EC_{50} (\text{freshwater invertebrate}) &gt; 1000 \text{ mg/L} )</td>
<td>( EC_{50} (\text{Algae inhibition}) &gt; 1000 \text{ mg/L} ) ( EC_{50} (\text{Daphnia magna}) = 265 \text{ mg/L} ) ( EC_{50} (\text{Algae inhibition, 96 hr}) = 860 \text{ mg/L} )</td>
</tr>
<tr>
<td>Terrestrial</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

| 12.2 | Persistence and Degradability | The components of this product decompose in soil and water. |
| 12.3 | Bioaccumulative Potential | The components of this product are not expected to bioaccumulate. |
| 12.4 | Mobility in Soil | When spilled onto soil, this product will infiltrate downward, the rate being greater with lower concentration because of reduced viscosity. During transport through the soil, this product will dissolve some of the soil material, in particular, carbonate-based materials. |
| 12.5 | Other Adverse Ecological Effects | This product may be harmful to aquatic life if large volumes of it are released into an aquatic environment. |
13. DISPOSAL CONSIDERATIONS

Preparing Wastes of this Product for Disposal
Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with local regulations. This product, if unaltered by the handling, may be disposed of by treatment at a permitted facility or as advised by your local waste regulatory authority.

Disposal of Contaminated Packaging
Cleaned containers can be recycled or disposed of as non-contaminated waste, if authorized by your local authorities. Dispose of containers as required by local regulations.

U.S. EPA Waste Number
Not applicable.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

14.1 UN Number
Not applicable

14.2 UN Proper Shipping Name
Not applicable

14.3 Transport Hazard Class(es)
Not applicable

Transport label(s) required
Not applicable

14.4 Packing Group
Not applicable

14.5 Marine Pollutant
Not applicable

Not applicable

14.6 Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)
Not applicable

14.7 Special Transport Precautions
Not applicable

National Motor Freight Classification
#70

International Air Transport Association

UN Number
Not applicable

UN Proper Shipping Name
Not applicable

Transport Hazard Class(es)
Not applicable

Transport label(s) required
Not applicable

Packing Group
Not applicable

IATA Emergency Response Code
Not applicable

Excepted Quantity
Not applicable

Packaging Instructions
Not applicable

International Maritime Organization

UN Number
Not applicable

UN Proper Shipping Name
Not applicable

Transport Hazard Class(es)
Not applicable

Transport label(s) required
Not applicable

Packing Group
Not applicable

Marine Pollutant
Not applicable

Not applicable

Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)
Not applicable
## 15. SAFETY, HEALTH and ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE PRODUCT

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>Chelate Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US EPA PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>Clean Air Act Hazardous Air Pollutants</td>
<td>NO</td>
</tr>
<tr>
<td>Safe Drinking Water Act</td>
<td>NO</td>
</tr>
<tr>
<td>RCRA F, K, P, U or D-lists</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 302 RQ</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 302 TPQ</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 313 LISTED</td>
<td>NO</td>
</tr>
<tr>
<td><strong>SARA CHEMICAL CATEGORIES</strong></td>
<td></td>
</tr>
<tr>
<td>SARA 311/312 ACUTE</td>
<td>YES</td>
</tr>
<tr>
<td>SARA 311/312 CHRONIC</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 311/312 FIRE</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 311/312 PRESSURE</td>
<td>NO</td>
</tr>
<tr>
<td>SARA 311/312 REACTIVITY</td>
<td>NO</td>
</tr>
<tr>
<td>EPA EXTREMELY HAZARDOUS SUBSTANCE</td>
<td>NO</td>
</tr>
<tr>
<td><strong>CALIFORNIA SAFE DRINKING WATER ACT (Proposition 65)</strong></td>
<td></td>
</tr>
<tr>
<td>This product does not contain any chemical listed on the California Safe Drinking Water Act list (Proposition 65)</td>
<td></td>
</tr>
<tr>
<td><strong>US OSHA PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>PEL</td>
<td>NO</td>
</tr>
<tr>
<td>PSM</td>
<td>NO</td>
</tr>
<tr>
<td><strong>CHEMICAL SECURITY PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>DHS CFATS</td>
<td>NO</td>
</tr>
<tr>
<td><strong>CHEMICAL WEAPONS CONVENTION</strong></td>
<td></td>
</tr>
<tr>
<td>CHEMICAL INVENTORY PROGRAMS</td>
<td></td>
</tr>
<tr>
<td>WHMIS</td>
<td>E</td>
</tr>
<tr>
<td>DSL</td>
<td>YES</td>
</tr>
<tr>
<td>NDSL</td>
<td>N/A</td>
</tr>
<tr>
<td>REACH Pre-registered List</td>
<td>YES</td>
</tr>
<tr>
<td>TSCA</td>
<td>YES</td>
</tr>
<tr>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>YES</td>
</tr>
<tr>
<td>EU No-Longer Polymers List (NLP)</td>
<td>YES</td>
</tr>
<tr>
<td>EEC Classification Packaging, and Labeling of Dangerous Substances (Annex 1)</td>
<td>Xn Harmful</td>
</tr>
<tr>
<td>Philippines</td>
<td>YES</td>
</tr>
<tr>
<td>Japan</td>
<td>NO</td>
</tr>
<tr>
<td>Australia</td>
<td>YES</td>
</tr>
<tr>
<td>Korea</td>
<td>YES</td>
</tr>
<tr>
<td>China</td>
<td>NO</td>
</tr>
<tr>
<td>New Zealand Inventory of Chemicals</td>
<td>YES</td>
</tr>
</tbody>
</table>

## 16. OTHER INFORMATION

16.1 Original Preparation 14 Nov 2005; update 11 April 2011
16.2 Revision History 21 Feb 2013 Reformatted to GHS Requirements
16.3 Prepared by ADVANCED CHEMICAL SAFETY, Inc.
PO Box 152329
San Diego, CA 92195
(858)-874-5577
16.4 Date of Printing April 28, 2015
A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**DEFINITIONS OF TERMS**

16.5

**Section 2**
- GHS: Global Harmonization System
- OSHA: U.S. Occupational Safety and Health Administration
- CLP: Classification and Packaging
- WHMIS: Workplace Hazardous Materials Information System
- STOT: Specific Target Organ Toxicity

**Section 3**
- CAS #: Chemical Abstract Service index number
- EU-INEC #: European Chemical Substances Information System index number

**Section 5**
- NFPA: National Fire Protection Association
- Health Hazard: 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); 1 (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that on short exposure could cause serious temporary or residual injury); 4 (materials that under very short exposure could cause death or major residual injury). Flammability Hazard
- Reactivity Hazard: Refer to definitions for “Hazardous Materials Identification System”
- Flash Point: Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air.
- Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition.
- LEL: The lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.
- UEL: The highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

**Section 8**
- ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.
- TLV: Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (TWA), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (C). Skin absorption effects must also be considered.
- PEL: Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register; 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, “Vacated 1989 PEL,” is placed next to the PEL which was vacated by Court Order.
- IDLH: Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The DFG - MAK is the Republic of Germany’s Maximum Exposure Level, similar to the U.S. PEL. NIOSH is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (OSHA). NIOSH issues exposure guidelines called Recommended Exposure Levels (RELs). When no exposure guidelines are established, an entry of NE (Not Established) is made for reference.

**Section 11**
- LD50: Lethal Dose (solids & liquids) which kills 50% of the exposed animals;
- LC50: Lethal Concentration (gases) which kills 50% of the exposed animals;
- ppm: Concentration expressed in parts of material per million parts of air or water;
- mg/m³: Concentration expressed in weight of substance per volume of air;
- mg/kg: Quantity of material, by weight, administered to a test subject, based on their body weight in kg
- IARC: the International Agency for Research on Cancer;
- NTP: the National Toxicology Program,
- RTECS: the Registry of Toxic Effects of Chemical Substances,
- OSHA and CAL/OSHA.
- LD50, LDLo, and LDCo, or LC50, LCLo, and LCCo, the lowest dose (or concentration) to cause lethal or toxic effects.
- BEI: Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

**Section 12**
- LC50#: The lowest concentration in water which kills 50% of the test subjects.
- EC50#: The Effect Concentration in water at which 50% of the test species if affected.

**Section 13**
- US EPA Hazardous Waste Codes: refer to 40 CFR 261.20

**Section 14**
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- IMO: International Maritime Organization
- IBC Code: Merchant Shipping Code

**Section 15**
- RCRA: Resource Conservation and Recovery Act
- SARA: US Superfund Amendments and Reauthorization Act
- DSL: Canadian Domestic Substances List
- NDSSL: Canadian Non-Domestic Substances List
- REACH: European Registration, Evaluation, Authorization and Restriction of Chemicals list
- TSCA: US Toxic Substances Control Act
SAFETY DATA SHEET
Xylene

Section 1. Identification

GHS product identifier : Xylene
Chemical name : Xylene
Synonyms : Xylo; Mixed Xylenes; Xylene Isomers and Ethylbenzene; Dimethylbenzenes and Ethylbenzene; Industrial-grade Xylene (meets ASTM D-364 Specifications); Nitration-grade Xylene (meets ASTM D-843 Specifications); CITGO® Material Code: 07306
Code : 07306
Supplier’s details : CITGO Petroleum Corporation
P.O. Box 4689
Houston, TX 77210
sdserv@citgo.com
Emergency telephone number : Technical Contact: (832) 486-4000
Medical Emergency: (832) 486-4700
CHEMTREC Emergency: (800) 424-9300
(United States Only)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY: INHALATION - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
CARCINOGENICITY: INHALATION - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) [Respiratory tract irritation] - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) [ears] - Category 2
ASPIRATION HAZARD - Category 1

GHS label elements
Hazard pictograms : ![Flammable](image1) ![Toxicity](image2) ![Caution](image3)

Signal word : Danger
Hazard statements : Flammable liquid and vapor.
Harmful if inhaled.
Causes serious eye irritation.
Causes skin irritation.
Suspected of causing cancer if inhaled.
May be fatal if swallowed and enters airways.
May cause respiratory irritation.
May cause damage to organs through prolonged or repeated exposure. (ears)

Precautionary statements
Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling.

Date of issue/Date of revision : 6/29/2015
Section 2. Hazards identification

Response: Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

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

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

Supplemental label elements: Avoid contact with skin and clothing. Wash thoroughly after handling.

Hazard not otherwise classified: Prolonged or repeated contact may dry skin and cause irritation.

Section 3. Composition/information on ingredients

Substance/mixture: Substance

Chemical name: Xylene

Other means of identification: Xylo; Mixed Xylenes; Xylene Isomers and Ethylbenzene; Dimethylbenzenes and Ethylbenzene; Industrial-grade Xylene (meets ASTM D-364 Specifications); Nitrating-grade Xylene (meets ASTM D-843 Specifications); CITGO® Material Code: 07306

CAS number/other identifiers

CAS number: 1330-20-7

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>60 - 100</td>
<td>1330-20-7</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>10 - 30</td>
<td>100-41-4</td>
</tr>
<tr>
<td>Cumene</td>
<td>0.1 - 1</td>
<td>98-82-8</td>
</tr>
</tbody>
</table>

* = Various  ** = Mixture  *** = Proprietary

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact: Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Section 4. First aid measures

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute

Potential acute health effects

Eye contact : Causes eye irritation. Causes serious eye irritation.

Inhalation : Harmful if inhaled. May cause respiratory irritation.

Skin contact : Causes skin irritation. Defatting to the skin.

Ingestion : May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
- pain or irritation
- watering
- redness

Inhalation : Adverse symptoms may include the following:
- respiratory tract irritation
- coughing

Skin contact : Adverse symptoms may include the following:
- irritation
- redness
- dryness
- cracking

Ingestion : Adverse symptoms may include the following:
- nausea or vomiting

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

Notes to physician : If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

Specific treatments : Treat symptomatically and supportively.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Specific hazards arising from the chemical : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Extinguishing media
## Section 5. Fire-fighting measures

**Suitable extinguishing media**: Use caution when applying carbon dioxide in confined spaces. SMALL FIRE: Steam, CO₂, dry chemical or inert gas (e.g., nitrogen). LARGE FIRE: Use foam, water fog or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, ignition or explosion.

**Unsuitable extinguishing media**: Do not use water jet.

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

**Special protective actions for fire-fighters**: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

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

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel**: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders**: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions**: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

### Methods and materials for containment and cleaning up

**Small spill**: Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill**: Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling
Section 7. Handling and storage

**Protective measures**: Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container. Non equilibrium conditions may increase the fire hazard associated with this product. Always bond receiving containers to the fill pipe before and during loading. Always confirm that receiving container is properly grounded. Bonding and grounding alone may be inadequate to eliminate fire and explosion hazards. Carefully review operations that may increase the risks such as tank and container filling, tank cleaning, sampling, gauging, loading, filtering, mixing, agitation, etc. In addition to bonding and grounding, efforts to mitigate the hazards may include, but are not limited to, ventilation, inerting and/or reduction of transfer velocities. Always keep nozzle in contact with the container throughout the loading process. Do NOT fill any portable container in or on a vehicle.

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

**Conditions for safe storage, including any incompatibilities**: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.

---

**Section 8. Exposure controls/personal protection**

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>ACGIH TLV (United States, 4/2014).</td>
</tr>
<tr>
<td></td>
<td>TWA: 100 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 434 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>STEL: 150 ppm 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>STEL: 651 mg/m³ 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013).</td>
</tr>
<tr>
<td></td>
<td>TWA: 100 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 435 mg/m³ 8 hours.</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>ACGIH TLV (United States, 4/2014).</td>
</tr>
<tr>
<td></td>
<td>TWA: 20 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013).</td>
</tr>
<tr>
<td></td>
<td>TWA: 100 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 435 mg/m³ 8 hours.</td>
</tr>
<tr>
<td>Cumene</td>
<td>ACGIH TLV (United States, 4/2014).</td>
</tr>
<tr>
<td></td>
<td>TWA: 50 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013).</td>
</tr>
</tbody>
</table>

---

**Date of issue/Date of revision**: 6/29/2015
Section 8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Xylenes, mixed (parent)</th>
<th>ACGIH TLV (United States)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA: 50 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 245 mg/m³ 8 hours.</td>
</tr>
</tbody>
</table>

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

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

Individual protection measures

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

Eye/face protection: Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection: Avoid skin contact with liquid. Chemical-resistant gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Heavy duty, industrial grade chemically resistant gloves constructed of nitrile, neoprene, polyethylene, fluororubber or polyvinyl chloride as approved by glove manufacturer. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Leather gloves are not protective for liquid contact.

Body protection: Avoid skin contact with liquid. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection: Avoid skin contact with liquid. Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Leather boots are not protective for liquid contact.

Respiratory protection: Avoid inhalation of gases, vapors, mists or dusts. Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If an air purifying respirator is appropriate, use one equipped with cartridges rated for organic vapors.
Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Transparent, colorless.</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet, pungent aromatic hydrocarbon.</td>
</tr>
<tr>
<td>pH</td>
<td>Not available.</td>
</tr>
<tr>
<td>Melting point</td>
<td>-48°C (-54.4°F)</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>138°C (280.4°F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Closed cup: 27°C (81°F) (Typical)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>0.8 (n-butyl acetate. = 1)</td>
</tr>
<tr>
<td>Lower and upper explosive (flammable) limits</td>
<td>Lower: 1%</td>
</tr>
<tr>
<td></td>
<td>Upper: 7%</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>0.93 kPa (7 mm Hg) [room temperature]</td>
</tr>
<tr>
<td>Vapor density</td>
<td>3.7 [Air = 1]</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.87</td>
</tr>
<tr>
<td>Density lbs/gal</td>
<td>7.25 lbs/gal</td>
</tr>
<tr>
<td>Gravity, °API</td>
<td>Estimated 31 @ 60 F</td>
</tr>
<tr>
<td>Solubility</td>
<td>Very slightly soluble in the following</td>
</tr>
<tr>
<td></td>
<td>materials: cold water.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>432°C (809.6°F)</td>
</tr>
</tbody>
</table>

Section 10. Stability and reactivity

| Reactivity                                    | Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s). |
| Chemical stability                            | The product is stable.                     |
| Possibility of hazardous reactions            | Under normal conditions of storage and use, hazardous reactions will not occur. |
| Conditions to avoid                           | Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Do not store with strong oxidizing agents. |
| Incompatible materials                        | Reactive or incompatible with the following materials: oxidizing materials |
| Hazardous decomposition products              | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>5000 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>6700 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Mouse</td>
<td>2119 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4300 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4300 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>&gt;5000 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3500 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Cumene</td>
<td>LC50 Inhalation Vapor</td>
<td>Mouse</td>
<td>10 g/m³</td>
<td>7 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>12300 uL/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2.9 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4000 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>
Section 11. Toxicological information

Conclusion/Summary: **Xylenes, mixed isomers**: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross over-exposure.

### Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>Skin - Mild irritant</td>
<td>Rat</td>
<td>-</td>
<td>8 hours 60 microliters</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>100 Percent</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 15 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>Cumene</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>86 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 10 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

**Skin**: **Xylenes, mixed isomers**: May cause skin irritation.

**Eyes**: **Xylenes, mixed isomers**: May cause eye irritation.

**Respiratory Sensitization**

Skin: No additional information.

Respiratory: No additional information.

**Mutagenicity**

Conclusion/Summary: No additional information.

**Carcinogenicity**

Conclusion/Summary: **Ethylbenzene**: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). Also, the incidence of tumors was elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as “possibly carcinogenic to humans” (Group 2B).

**Classification**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>-</td>
<td>2B</td>
<td>-</td>
</tr>
<tr>
<td>Cumene</td>
<td>-</td>
<td>2B</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
</tr>
</tbody>
</table>

**Reproductive toxicity**

Conclusion/Summary: **Ethylbenzene**: Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time.

**Teratogenicity**

Conclusion/Summary: No additional information.

**Specific target organ toxicity (single exposure)**

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

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylbenzene</td>
<td>Category 2</td>
<td>Inhalation</td>
<td>ears</td>
</tr>
</tbody>
</table>

**Aspiration hazard**

<table>
<thead>
<tr>
<th>Name</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylbenzene</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
</tbody>
</table>

**Information on the likely routes of exposure**

<table>
<thead>
<tr>
<th>Eye contact</th>
<th>Inhalation</th>
<th>Skin contact</th>
<th>Ingestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes eye irritation. Causes serious eye irritation.</td>
<td>Harmful if inhaled. May cause respiratory irritation.</td>
<td>Causes skin irritation. Defatting to the skin.</td>
<td>May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Eye contact</th>
<th>Inhalation</th>
<th>Skin contact</th>
<th>Ingestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse symptoms may include the following: pain or irritation watering redness</td>
<td>Adverse symptoms may include the following: respiratory tract irritation coughing</td>
<td>Adverse symptoms may include the following: irritation redness dryness cracking</td>
<td>Adverse symptoms may include the following: nausea or vomiting</td>
</tr>
</tbody>
</table>

**Potential chronic health effects**

<table>
<thead>
<tr>
<th>General</th>
<th>Carcinogenicity</th>
<th>Mutagenicity</th>
<th>Teratogenicity</th>
<th>Developmental effects</th>
<th>Fertility effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>May cause damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.</td>
<td>Suspected of causing cancer if inhaled. Risk of cancer depends on duration and level of exposure.</td>
<td>No known significant effects or critical hazards.</td>
<td>No known significant effects or critical hazards.</td>
<td>No known significant effects or critical hazards.</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

Section 12. Ecological information

**Toxicity**
**Section 12. Ecological information**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Xylenes, mixed isomers</strong></td>
<td>Acute EC50 90 mg/l Fresh water</td>
<td>Crustaceans - Cypris subglobosa</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 8.5 ppm Marine water</td>
<td>Crustaceans - Palaemonetes pugio - Adult</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 8500 µg/l Marine water</td>
<td>Crustaceans - Palaemonetes pugio</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 15700 µg/l Fresh water</td>
<td>Fish - Lepomis macrochirus - Juvenile (Fledgling, Hatchling, Weanling)</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 19000 µg/l Fresh water</td>
<td>Fish - Lepomis macrochirus</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 13400 µg/l Fresh water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 16940 µg/l Fresh water</td>
<td>Fish - Carassius auratus</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 4600 µg/l Fresh water</td>
<td>Algae - Pseudokirchneriella subcapitata</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 3600 µg/l Fresh water</td>
<td>Algae - Pseudokirchneriella subcapitata</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 2930 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 5200 µg/l Marine water</td>
<td>Crustaceans - Americamysis bahia</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 4200 µg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 1000 µg/l Fresh water</td>
<td>Algae - Pseudokirchneriella subcapitata</td>
<td>96 hours</td>
</tr>
<tr>
<td><strong>Ethylbenzene</strong></td>
<td>Acute EC50 2600 µg/l Fresh water</td>
<td>Algae - Pseudokirchneriella subcapitata</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 7400 µg/l Fresh water</td>
<td>Crustaceans - Artemia sp. - Nauplii</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 10600 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2700 µg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

**Conclusion/Summary**: Not available.

**Persistence and degradability**

**Conclusion/Summary**: Not available.

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogPow</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>3.12</td>
<td>8.1 to 25.9</td>
<td>low</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>3.6</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Cumene</td>
<td>3.55</td>
<td>94.69</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

**Soil/water partition coefficient (Koc)**: Not available.

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

**Section 13. Disposal considerations**

**Disposal methods**: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive...
Section 13. Disposal considerations

atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

RCRA classification : D001, D018

United States - RCRA Toxic hazardous waste "U" List

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>Status</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylene</td>
<td>1330-20-7</td>
<td>Listed</td>
<td>U239</td>
</tr>
</tbody>
</table>

Section 14. Transport information

<table>
<thead>
<tr>
<th>UN number</th>
<th>DOT Classification</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1307</td>
<td>RQ, Xylenes, 3, UN 1307, PG III</td>
<td>RQ, Xylenes, 3, UN 1307, PG III</td>
<td>RQ, Xylenes, 3, UN 1307, PG III</td>
</tr>
</tbody>
</table>

Transport hazard class(es) 3

Packing group III

Environmental hazards No.

Additional information

Reportable quantity 125 lbs / 56.749 kg [17.232 gal / 65.229 L]

Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

Packaging instruction

Passenger aircraft Quantity limitation: 60 L

Cargo aircraft Quantity limitation: 220 L

Passenger and Cargo Aircraft Quantity limitation: 60 L

Cargo Aircraft Only Quantity limitation: 220 L

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

Date of issue/Date of revision : 6/29/2015
Section 15. Regulatory information

**U.S. Federal regulations**
- United States inventory (TSCA 8b): All components are listed or exempted.
- Clean Water Act (CWA) 307: Ethylbenzene; Toluene; Benzene; Naphthalene
- Clean Water Act (CWA) 311: Xylene

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

**SARA 302/304**
**Composition/information on ingredients**

**SARA 304 RQ**
- Not applicable.

**SARA 311/312**
**Classification**
- Fire hazard
- Immediate (acute) health hazard
- Delayed (chronic) health hazard

**Composition/information on ingredients**

<table>
<thead>
<tr>
<th>Name</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes, mixed isomers</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
<tr>
<td>Cumene</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

**SARA 313**

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form R - Reporting requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylenes, mixed isomers</td>
<td>1330-20-7</td>
<td>&lt;90</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100-41-4</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Supplier notification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylenes, mixed isomers</td>
<td>1330-20-7</td>
<td>&lt;90</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100-41-4</td>
<td>&lt;30</td>
</tr>
</tbody>
</table>

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

**State regulations**
- Massachusetts: The following components are listed: XYLENE
- New York: The following components are listed: Xylene (mixed)
- New Jersey: The following components are listed: XYLENES; BENZENE, DIMETHYL-
- Pennsylvania: The following components are listed: BENZENE, DIMETHYL-

**California Prop. 65**

**WARNING:** This product contains a chemical known to the State of California to cause cancer.

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

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylbenzene</td>
<td>&lt;30</td>
<td>Yes.</td>
<td>No.</td>
<td>41 μg/day (ingestion) 54 μg/day (inhalation)</td>
<td>No.</td>
</tr>
<tr>
<td>Cumene</td>
<td>&lt;1</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Toluene</td>
<td>&lt;0.1</td>
<td>Yes.</td>
<td>Yes.</td>
<td>6.4 μg/day (ingestion) 13 μg/day</td>
<td>No. 7000 μg/day (ingestion) 24 μg/day (ingestion) 49 μg/day (inhalation)</td>
</tr>
<tr>
<td>Benzene</td>
<td>&lt;0.01</td>
<td>Yes.</td>
<td>Yes.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 15. Regulatory information

<table>
<thead>
<tr>
<th>Naphthalene</th>
<th>&lt;0.0001</th>
<th>Yes.</th>
<th>No.</th>
<th>(inhalation)</th>
<th>Yes.</th>
<th>No.</th>
</tr>
</thead>
</table>

**International regulations**

- **International lists**
  - **Australia inventory (AICS):** All components are listed or exempted.
  - **China inventory (IECSC):** All components are listed or exempted.
  - **Japan inventory:** All components are listed or exempted.
  - **Korea inventory:** All components are listed or exempted.
  - **Malaysia Inventory (EHS Register):** All components are listed or exempted.
  - **New Zealand Inventory of Chemicals (NZIoC):** All components are listed or exempted.
  - **Philippines inventory (PICCS):** All components are listed or exempted.
  - **Taiwan inventory (CSNN):** All components are listed or exempted.

- **Canada inventory:** All components are listed or exempted.
- **EU Inventory:** All components are listed or exempted.
- **WHMIS (Canada):**
  - Class B-2: Flammable liquid
  - Class D-2A: Material causing other toxic effects (Very toxic).
  - Class D-2B: Material causing other toxic effects (Toxic).

Section 16. Other information

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

- Flammability: 2
- Health: 2
- Instability/Reactivity: 0
- Special:

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**History**

- **Date of issue/Date of revision:** 6/29/2015.
- **Key to abbreviations:**
  - ATE = Acute Toxicity Estimate
  - BCF = Bioconcentration Factor
  - GHS = Globally Harmonized System of Classification and Labelling of Chemicals
  - IATA = International Air Transport Association
  - IBC = Intermediate Bulk Container
  - IMDG = International Maritime Dangerous Goods
  - LogPow = logarithm of the octanol/water partition coefficient
  - UN = United Nations

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