MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name: Sulfuric Acid
Version #: 09
Revision date: 08-25-2011
CAS #: Mixture
Product Codes: J.T.Baker: 5030, 5137, 5374, 5802, 5815, 5859, 6163, 6902, 9671, 9673, 9674, 9675, 9681, 9684, 9690, 9691, 9697, 9864; Macron: 21201, 2876, 2877, 2878, 2879, 2900, 2904, 3780, 5557, H976, H996, V008, V186, V225, V648, V651

Synonym(s): Oil of vitriol * Babcock acid * Sulphuric acid

Manufacturer information: Avantor Performance Materials, Inc.
3477 Corporate Parkway
Suite #200
Center Valley, PA 18034 US
24 Hour Emergency 908-859-2151
Chemtrec 800-424-9300
Customer Service 855-282-6867

2. Hazards Identification

Emergency overview: DANGER

STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

Corrosive. Causes severe skin and eye burns. Causes digestive tract burns. Mist or vapor extremely irritating to eyes and respiratory tract. Material reacts with water.

Potential health effects:

Routes of exposure: Ingestion. Inhalation. Skin contact. Eye contact.

Eyes: Corrosive. Causes severe eye burns. Vapor or spray may cause eye damage, impaired sight or blindness.

Skin: Corrosive. Causes severe skin burns.

Inhalation: Corrosive. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Ingestion: Corrosive. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.

Target organs: Eyes. Skin. Lungs. Respiratory system.

Chronic effects: Cancer hazard - can cause cancer. Corrosive. Prolonged contact causes serious tissue damage.

Potential environmental effects: Harmful to aquatic organisms. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

3. Composition / Information on Ingredients

Hazardous components

<table>
<thead>
<tr>
<th>Material name</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td>7664-93-9</td>
<td>60 - 100</td>
</tr>
</tbody>
</table>

Non-hazardous components

<table>
<thead>
<tr>
<th>Material name</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>7732-18-5</td>
<td>2 - 7</td>
</tr>
</tbody>
</table>
### 4. First Aid Measures

**First aid procedures**

| Eye contact | Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately. |
| Skin contact | Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. |
| Inhalation | Move to fresh air. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen. Call a physician or poison control center immediately. |
| Ingestion | Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. |

**Notes to physician**

| Keep victim under observation. Treat symptomatically. |

**General advice**

| In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. |

### 5. Fire Fighting Measures

| Flammable properties | The product is not flammable. No unusual fire or explosion hazards noted. |
| Extinguishing media | Carbon dioxide (CO2). Dry chemical powder. Foam. |
| Unsuitable extinguishing media | Do not use water as an extinguisher. |
| Specific hazards arising from the chemical | Fire may produce irritating, corrosive and/or toxic gases. |
| Protective equipment for firefighters | Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Wear self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode when fighting fires. |

**Fire fighting equipment/instructions**

| Use water spray to cool unopened containers. Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Cool containers exposed to flames with water until well after the fire is out. |

**Specific methods**

| In the event of fire and/or explosion do not breathe fumes. |

### 6. Accidental Release Measures

| Personal precautions | Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. |
| Environmental precautions | Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. |
| Methods for containment | Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas. |
Methods for cleaning up

Large Spills: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

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

Never return spills in original containers for re-use. Clean up in accordance with all applicable regulations. Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for prompt disposal.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Handling

Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when combining with water; DO NOT add water to acid, ALWAYS add acid to water while stirring to prevent release of heat, steam and fumes.

Storage

Keep tightly closed in a dry, cool and well-ventilated place. Do not store in metal containers.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID (7664-93-9)</td>
<td>TWA</td>
<td>0.2000 mg/m3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID (7664-93-9)</td>
<td>TWA</td>
<td>0.2000 mg/m3</td>
<td>Thoracic fraction.</td>
</tr>
<tr>
<td>SULFURIC ACID (7664-93-9)</td>
<td>STEL</td>
<td>3.0000 mg/m3</td>
<td></td>
</tr>
<tr>
<td>SULFURIC ACID (7664-93-9)</td>
<td>TWA</td>
<td>1.0000 mg/m3</td>
<td></td>
</tr>
</tbody>
</table>

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.

Personal protective equipment

Eye / face protection

Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with acid gas cartridge.

General

Provide eyewash station and safety shower. Wear chemical protective equipment that is specifically recommended by the manufacturer. Launder contaminated clothing before reuse.

9. Physical & Chemical Properties

Appearance

Aqueous solution.

Color

Clear.

Odor

Odorless.

Odor threshold

Not available.

Physical state

Liquid.
Form: Liquid.

pH: 0.3 (1 N sol)

Melting point: 3°C (100%), -32°C (93%)

Freezing point: 3°C (100%), -32°C (93%)

Boiling point: 638.6 °F (337 °C) (98%)

Flash point: Not available.

Evaporation rate: Not available.

Flammability limits in air, upper, % by volume: Not available.

Flammability limits in air, lower, % by volume: Not available.

Vapor pressure: 0 kPa

Vapor density: 3.4

Specific gravity: 1.84 (98%)

Relative density: Not available.

Solubility (water): Miscible. Miscible.

Partition coefficient (n-octanol/water): Not available

Auto-ignition temperature: Not available.

Decomposition temperature: 644 °F (340 °C)

10. Chemical Stability & Reactivity Information

Chemical stability: Material is stable under normal conditions. Material reacts with water.

Conditions to avoid: Moisture. Heat.


Hazardous decomposition products: Sulphur oxides. Irritating and/or toxic fumes and gases may be emitted upon the products decomposition.

Possibility of hazardous reactions: Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product: Sulfuric Acid (Mixture)

Test Results

Acute Inhalation LC50 Rat: 368 mg/l estimated

Acute Oral LD50 Rat: 2271 mg/kg estimated

Components

Product: SULFURIC ACID (7664-93-9)

Test Results

Acute Inhalation LC50 Rat: 347 mg/l 1.00 Hours

Acute Oral LD50 Rat: 2140 mg/kg

Acute effects: Strongly corrosive. May cause deep tissue damage. Vapors are corrosive. After some hours, injured persons may develop serious shortness of breath and lung edema.

Sensitization: Not a skin sensitizer.

Local effects: Causes severe burns.

Chronic effects: Corrosive. Prolonged contact causes serious tissue damage.

Carcinogenicity: Contains a substance which may cause cancer by inhalation. Suspected to increase risk of cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

SULFURIC ACID (CAS 7664-93-9) 1 Carcinogenic to humans.
Neurological effects: No data available for this product.

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

Reproductive effects: Contains no ingredient listed as toxic to reproduction.

Teratogenicity: No data available to indicate product or any components present at greater than 0.1% may cause birth defects.

Symptoms and target organs: Corrosive effects.

Epidemiology: No epidemiological data is available for this product.

Further information: Danger of very serious irreversible effects. Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric Acid (Mixture)</td>
<td>LC50 Fish: 44.56 mg/l 96.00 hours estimated</td>
</tr>
<tr>
<td>Components</td>
<td></td>
</tr>
<tr>
<td>SULFURIC ACID (7664-93-9)</td>
<td>LC50 Western mosquitofish (Gambusia affinis): 42 mg/l 96.00 hours</td>
</tr>
</tbody>
</table>

Ecotoxicity: Harmful to aquatic life. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

Persistence and degradability: Expected to be readily biodegradable.

Partition coefficient: Not available

13. Disposal Considerations

Disposal instructions: Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations.

Waste from residues / unused products: Dispose of in accordance with local regulations.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied. Offer rinsed packaging material to local recycling facilities.

14. Transport Information

TDG

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>SULFURIC ACID with more than 51 per cent acid; or SULPHURIC ACID with more than 51 per cent acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard class</td>
<td>8</td>
</tr>
<tr>
<td>UN number</td>
<td>UN1830</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
</tbody>
</table>
15. Regulatory Information

**Canadian regulations**

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

**WHMIS status**

Controlled

**WHMIS classification**

D1A - Immediate/Serious-VERY TOXIC
D2A - Other Toxic Effects-VERY TOXIC
E - Corrosive

**WHMIS labeling**

**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>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<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>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</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)

**Saf-T-Data**

Health: 3 - Severe (Poison)

Flammability: 0 - None

Reactivity: 2 - Moderate

Contact: 4 - Extreme (Corrosive)

Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: W - White (Corrosive)

16. Other Information

**NFPA ratings**

Health: 3

Flammability: 0

Instability: 1

Special hazards: W
Disclaimer

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Issue date 08-25-2011

This data sheet contains changes from the previous version in section(s): Chemical Stability & Reactivity Information: Incompatible materials