1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sulfuric acid solution, 4.0N
Cat No.: SA818-1; SA818-4; SA818-20; SA818-500
Synonyms: Oil of vitriol solution; Hydrogen sulfate solution
Recommended Use: Laboratory chemicals

Company: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number:
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 703-527-3887

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview:
Causes severe burns by all exposure routes. May be harmful if inhaled. Water reactive. Contact with combustible material may cause fire.

Appearance: Clear
Physical State: Liquid
odor: odorless

Target Organs: Respiratory system, Eyes, Skin, Gastrointestinal tract (GI), Kidney, Blood, Teeth

Potential Health Effects:

Acute Effects:

<table>
<thead>
<tr>
<th>Route</th>
<th>Effect Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Causes severe burns. May cause blindness or permanent eye damage.</td>
</tr>
<tr>
<td>Skin</td>
<td>Causes severe burns. May be harmful in contact with skin.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Causes severe burns. May be harmful if inhaled.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Causes severe burns. May be harmful if swallowed.</td>
</tr>
</tbody>
</table>

Chronic Effects:
Experiments have shown reproductive toxicity effects on laboratory animals. May cause adverse kidney effects. Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen.

See Section 11 for additional Toxicological information.
Aggravated Medical Conditions

No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>81 - 82</td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>7664-93-9</td>
<td>18 - 19</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion
Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point
Method
Not applicable
No information available.

Autoignition Temperature
No information available.

Explosion Limits
Upper
No data available

Lower
No data available

Suitable Extinguishing Media
Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media
DO NOT USE WATER!

Hazardous Combustion Products
No information available.

Sensitivity to mechanical impact
No information available.

Sensitivity to static discharge
No information available.

Specific Hazards Arising from the Chemical
Water reactive. May ignite combustibles (wood paper, oil, clothing, etc.). Contact with metals may evolve flammable hydrogen gas. Thermal decomposition can lead to release of irritating gases and vapors.

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
Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Do not get in eyes, on skin, or on clothing.

Environmental Precautions
Should not be released into the environment.

Methods for Containment and Clean Up
Soak up with inert absorbent material. Do not expose spill to water. Keep combustibles (wood, paper, oil, etc) away from spilled material. Keep in suitable and closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Use only under a chemical fume hood. Wear personal protective equipment. Do not allow contact with water. Keep away from clothing and other combustible materials. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures
Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV TWA: 0.2 mg/m³</th>
<th>OSHA PEL (Vacated) TWA: 1 mg/m³</th>
<th>NIOSH IDLH IDLH: 15 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td></td>
<td>TWA: 1 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Quebec TWA: 1 mg/m³</th>
<th>Mexico OEL (TWA) TWA: 1 mg/m³</th>
<th>Ontario TWAEV TWA: 0.2 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment

<table>
<thead>
<tr>
<th>Eye/face Protection</th>
<th>Skin and body protection</th>
<th>Respiratory Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear appropriate protective eyeglasses</td>
<td>Weath appropriate protective gloves and clothing to prevent skin exposure</td>
<td>Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced</td>
</tr>
</tbody>
</table>

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Appearance</th>
<th>odor</th>
<th>Odor Threshold</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>Clear</td>
<td>odorless</td>
<td>No information available.</td>
<td>0.3 (1N)</td>
</tr>
</tbody>
</table>
9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure
< 0.001 mmHg  @  20 °C

Vapor Density
3.38 (Air = 1.0)

Viscosity
No information available.

Boiling Point/Range
290 - 338°C / 554 - 640.4°F

Melting Point/Range
10°C / 50°F

Decomposition temperature °C
No information available.

Flash Point
Not applicable

Evaporation Rate
Slower than ether

Specific Gravity
1.5

Solubility
Soluble in water

log Pow
No data available

Molecular Weight
98.07

Molecular Formula
H2SO4

10. STABILITY AND REACTIVITY

Stability
Water reactive.

Conditions to Avoid
Incompatible products. Excess heat. Exposure to moist air or water. Combustible material.

Incompatible Materials
Metals, Powdered metals, Reducing agents, Bases, Organic materials

Hazardous Decomposition Products
Sulfur oxides, Hydrogen

Hazardous Polymerization
Hazardous polymerization does not occur

Hazardous Reactions
Contact with metals may evolve flammable hydrogen gas.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

<table>
<thead>
<tr>
<th>Component Information</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>90 mL/kg</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>2140 mg/kg</td>
<td>Not listed</td>
<td>510 mg/m³ ( Rat ) 2 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>347 ppm ( Rat ) 1 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>320 mg/m³ ( Mouse ) 2 h</td>
</tr>
</tbody>
</table>

Irritation
Causes severe burns by all exposure routes

Toxicologically Synergistic Products
No information available.

Chronic Toxicity

Carcinogenicity
The table below indicates whether each agency has listed any ingredient as a carcinogen.
### ACGIH: (American Conference of Governmental Industrial Hygienists)
- A1 - Known Human Carcinogen
- A2 - Suspected Human Carcinogen
- A3 - Animal Carcinogen

### IARC: (International Agency for Research on Cancer)
- Group 1 - Carcinogenic to Humans
- Group 2A - Probably Carcinogenic to Humans
- Group 2B - Possibly Carcinogenic to Humans

#### Sensitization
No information available.

#### Mutagenic Effects
Mutagenic effects have occurred in experimental animals.

#### Reproductive Effects
Experiments have shown reproductive toxicity effects on laboratory animals.

#### Developmental Effects
Developmental effects have occurred in experimental animals.

#### Teratogenicity
No information available.

#### Other Adverse Effects
The toxicological properties have not been fully investigated.

#### Endocrine Disruptor Information
No information available

### 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>EC50: 29 mg/L/24h</td>
</tr>
</tbody>
</table>

#### Persistence and Degradability
No information available

#### Bioaccumulation/ Accumulation
No information available

#### Mobility
No information available

### 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
## 14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2796</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>SULFURIC ACID</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

### TDG

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2796</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>SULFURIC ACID</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

### IATA

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2796</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>SULFURIC ACID</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

### IMDG/IMO

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2796</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>SULFURIC ACID</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

## 15. REGULATORY INFORMATION

### International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-791-2</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>KE-35400 X</td>
<td></td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td></td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-639-5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>KE-32570 X</td>
<td></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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>7664-93-9</td>
<td>18 - 19</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Categorization

- Acute Health Hazard: No
- Chronic Health Hazard: No
- Fire Hazard: No
- Sudden Release of Pressure Hazard: No
- Reactive Hazard: No

Clean Water Act

<table>
<thead>
<tr>
<th>Component</th>
<th>CWA - Hazardous Substances</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>X</td>
<td>1000 lb</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Clean Air Act

Not applicable

OSHA

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>1000 lb</td>
<td>1000 lb</td>
</tr>
</tbody>
</table>

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

<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>Sulfuric acid</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): Y
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

Canada

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 Hazard Class
D1B  Toxic materials
E    Corrosive material

16. OTHER INFORMATION

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Tel: (412) 490-8929

Creation Date
12-Feb-2010

Print Date
12-Feb-2010

Revision Summary
“***”, and red text indicates revision

Disclaimer
The information provided on 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as 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 material or in any process, unless specified in the text.

End of MSDS