1. PRODUCT AND COMPANY DESCRIPTION

RHODIA INC.
ECO SERVICES
CN 7500
Cranbury NJ 08512

Emergency Phone Numbers:
FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC (800-424-9300 within the United States or 703-527-3887 for international collect calls) or Rhodia CAERS (Communication and Emergency Response System) at 800-916-3232.

For Product Information:
(800) 642-4200

Chemical Name or Synonym:
OLEUM

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Reg Number</th>
<th>OSHA Hazard</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td>7664-93-9</td>
<td>Y</td>
<td>114.6</td>
</tr>
<tr>
<td>SULFUR TRIOXIDE</td>
<td>7446-11-9</td>
<td>Y</td>
<td>65</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

A. EMERGENCY OVERVIEW:

Physical Appearance and Odor:
cloudy fuming liquid, sharp, irritating odor.

Warning Statements:
DANGER! CORROSIVE TO SKIN, EYES AND RESPIRATORY TRACT. CAUSES SEVERE BURNS. MAY BE FATAL IF INHALED. REACTS VIOLENTLY WITH COMMON MATERIALS INCLUDING WATER, ALCOHOLS, BASES AND AMINES. STRONG OXIDIZER. CONTACT WITH OTHER MATERIALS MAY CAUSE FIRE. CONTENTS MAY BE UNDER PRESSURE OF EXPLOSIVE, FLAMMABLE HYDROGEN GAS.

B. POTENTIAL HEALTH EFFECTS:

Acute Eye:
Corrosive. Causes burns, tissue destruction, Can cause blindness.

Acute Skin:
http://rio/msds/files/0000124260000100010076E00017.HTM
Corrosive. Causes redness, inflammation, burns.

Acute Inhalation:
May be fatal or harmful if inhaled. Causes upper respiratory tract irritation, lung irritation, chest pain, wheezing, shortness of breath, a burning sensation, tickling of the nose and throat, sneezing. Repeated exposure to high levels of sulfuric acid mist may cause etching of tooth enamel in persons who breathe through their mouths.

Acute Ingestion:
Harmful if ingested. Can cause irritation, abdominal pain, corrosion.

Chronic Effects:
When mists are released from this product they are considered to be probable or suspected human carcinogens (see Section 11 - Chronic).

4. FIRST AID MEASURES

FIRST AID MEASURES FOR ACCIDENTAL:

Eye Exposure:
Immediately flush the eyes with a steady, gentle stream of running water for at least 15 minutes. Hold the eyelids apart during the irrigation to ensure flushing of the entire surface of the eye and lids with water. Obtain medical attention, preferably from an ophthalmologist. Oils or ointments should not be applied unless directed by physician. Continue the irrigation for an additional 15 minutes if a physician is not immediately available.

Skin Exposure:
Immediately wipe excess material off the skin with a dry cloth and flush affected areas with plenty of water for 15 minutes. Remove contaminated clothing while under the shower. Continue washing with water. Do not attempt to neutralize with chemical agents. Obtain medical attention.

Inhalation:
Remove the person from contaminated atmosphere and assure that the victim is breathing. If breathing has ceased, start artificial respiration. Oxygen, if available, should only be administered by a qualified technician under the direction of a physician. Keep warm and comfortable. Obtain medical attention immediately.

Ingestion:
DO NOT INDUCE VOMITING. If the person is conscious and has no trouble breathing a small (no more than one glass) amount of water may be given. Do not leave victim unattended. To prevent aspiration of the swallowed product, lay victim on side with head lower than waist. If vomiting occurs do not re-administer water. Do not give anything by mouth to an unconscious person. IMMEDIATELY obtain medical attention.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:
Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

NOTES TO PHYSICIAN:
All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

This material is an acid. The primary toxicity of this product is due to its irritant effects on mucous membranes.

INHALATION: If cough or shortness of breath occurs, evaluate the possibility of bronchitis or pneumonitis. Chest x-ray and arterial blood gases can be used to determine the presence of pulmonary edema. In severe cases, use of humidified oxygen and assisted ventilation including positive end expiratory pressure (PEEP) may be needed. Parenteral steroids may be useful in limiting the extent of pulmonary damage.

SKIN: Wash exposed area thoroughly with soap and water. Chemical burns from strong acids are generally treated the same as thermal burns.

EYES: Irrigate eyes for 15 minutes with sterile saline. If irritation, pain, swelling, photophobia or lacrimation persist, examination by an ophthalmologist is recommended.
INGESTION: If not already performed by first aid personnel, irrigate mouth with large amounts of water and dilute the acid by having victim drink 4 to 8 ounces of water or milk. DO NOT induce vomiting. Use of gastric lavage is controversial. The advantage of removal of acid must be weighed against the risk of perforation or bleeding. If a large amount of acid (> 1 ml/kg body weight) has been recently ingested, cautious gastric lavage is generally advised if the patient is alert and there is little risk of convulsions. Consultation with a gastroenterologist and/or surgeon is advised. Serious complications such as perforation or stricture of the esophagus may occur requiring care by specialists. Laryngeal edema may develop requiring intubation or tracheostomy.

5. FIRE FIGHTING MEASURES

FIRE HAZARD DATA:

Flash Point:
Not Applicable

Extinguishing Media:
Not combustible. Use extinguishing method suitable for surrounding fire. Recommended (small fires): dry chemical, carbon dioxide. Recommended (large fire): dry sand, water spray (massive amount), Not recommended: water (unless large excess is possible).

Special Fire Fighting Procedures:
Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full acid-resistant protective clothing. Fight fire from maximum distance.

Unusual Fire and Explosion Hazards:
Not combustible. Strong oxidizers can react with reducing agents or combustibles producing heat and causing ignition. Reacts violently with water releasing heat and corrosive material. The addition of water into a ruptured tank may cause an explosion and the formation of a thick cloud of corrosive, highly toxic smoke capable of travelling long distances.

Hazardous Decomposition Materials (Under Fire Conditions):
oxides of sulfur

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:
Personnel handling this material should be thoroughly trained to handle spills and releases. Do not direct hose streams into an unignited transportation spill (tank truck or tank car).

Containment of Spill:
Stop leak if it can be done without risk. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike or retain dilution water or water from firefighting for later disposal.

Cleanup and Disposal of Spill:
Pump any free liquid into an appropriate closed container (see Section 7: Handling and Storage). Exercise caution during neutralization as considerable heat may be generated. Neutralize spill area with soda ash, sodium bicarbonate or lime.

Environmental and Regulatory Reporting:
Do not flush to drain. Runoff from fire control or dilution water may cause pollution. Dispose of as a hazardous waste. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact the Technical Service Department using the Product Information phone number in Section 1.

7. HANDLING AND STORAGE
Minimum/Maximum Storage Temperatures:
Not Available

Handling:
Do not breathe vapors and mists. Do not get on skin or in eyes. This product reacts violently with bases liberating heat and causing spattering.

When diluting an acid, ALWAYS add the acid slowly to water and stir well to avoid spattering. NEVER ADD WATER TO ACID.

Storage:
Store in tightly closed containers. Store in an area that is dry, well-ventilated. Expected shelf life if stored at recommended temperature (4C) : 6 months. Freezing point varies with concentration. Maximum recommended storage temperature = 104F (40C). Corrosion rates increase at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Introductory Remarks:
These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

Exposure Guidelines:
Exposure limits represent regulated or recommended worker breathing zone concentrations measured by validated sampling and analytical methods, meeting the regulatory requirements. The following limits apply to this material, where, if indicated, S=skin and C=ceiling limit:

<table>
<thead>
<tr>
<th>SULFURIC ACID</th>
<th>Notes</th>
<th>TWA</th>
<th>STEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td></td>
<td>0.2 mg/cu m</td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td>1 mg/cu m</td>
<td></td>
</tr>
<tr>
<td>RHODIA</td>
<td></td>
<td>0.3 mg/cu m</td>
<td></td>
</tr>
</tbody>
</table>

Engineering Controls:
Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures: local exhaust ventilation at the point of generation.

Respiratory Protection:
When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations.

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge and particulate filter (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P particulate filter. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator.

Eye/Face Protection:
Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. Contact to face and eyes should be prevented through use of a face shield and splash proof goggles. An emergency eye wash must be readily accessible to the work area.

Skin Protection:

Skin contact must be prevented through the use of permeation resistant clothing, gloves and footwear, selected with regard for use conditions and exposure potential. An emergency shower must be readily accessible to the work area. Consideration must be given both to durability as well as permeation resistance.

**Work Practice Controls:**
Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

1. Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
2. Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
3. Wash exposed skin promptly to remove accidental splashes or contact with this material.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product Information phone number in Section 1 for its exact specifications.

**Physical Appearance:**
cloudy fuming liquid.

**Odor:**
sharp, irritating odor.

**pH:**
< 1 at 1 wt/wt%.

**Specific Gravity:**
1.992 at 4 C (39 F).

**Water Solubility:**
miscible

**Melting Point Range:**
Not Available

**Freezing Point Range:**
1 C (34 F)

**Boiling Point Range:**
65 C (149 F) at mmHg

**Vapor Pressure:**
78.76 mmHg at 20 C (68 F)

**Vapor Density:**
Not Available

### 10. STABILITY AND REACTIVITY

**Chemical Stability:**
This material is stable under normal handling and storage conditions described in Section 7.

**Conditions To Be Avoided:**
water
Materials/Chemicals To Be Avoided:
water
strong reducing agents
halogens
bases
metals
nitrogen compounds

The Following Hazardous Decomposition Products Might Be Expected:

Decomposition Type: thermal
oxides of sulfur

Hazardous Polymerization Will Not Occur.

Avoid The Following To Inhibit Hazardous Polymerization:
not applicable

11. TOXICOLOGICAL INFORMATION

Acute Eye Irritation:
The following data are for similar or related products.
Toxicological Information and Interpretation:
  eye - eye irritation, 250 ug/24 hr, rabbit. Severely irritating. Data for sulfuric acid.

Acute Skin Irritation:
No test data found for product. This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Dermal Toxicity:
No test data found for product. This product was not tested because strong bases are known to be corrosive and to cause severe tissue destruction.

Acute Respiratory Irritation:
The following data is for similar or related products.
Toxicological Information and Interpretation:
  lung - lung irritation, < 5 mg/cu m, human. Mildly irritating. Data for sulfuric acid.

Acute Inhalation Toxicity:
The following data is for similar or related products.
Toxicological Information and Interpretation:
  LC50 - lethal concentration 50% of test species, 347 ppm/1 hr, rat. Data for sulfuric acid.
  LC50 - lethal concentration 50% of test species, 510 mg/cu m/2 hr, rat. Data for sulfuric acid.

Acute Oral Toxicity:
The following data is for similar or related products.
Toxicological Information and Interpretation:
  LD50 - lethal dose 50% of test species, 2140 mg/kg, rat. Data for sulfuric acid.

Chronic Toxicity:
This product contains the substances that are considered to be "probable" or "suspected" human carcinogens as follows:
The International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) have classified "occupational exposure to strong inorganic acid mists containing sulfuric acid" as a known human carcinogen (IARC Category 1). This classification applies only to sulfuric acid when generated as a mist. There is still debate in the scientific community whether the studies reviewed by IARC and NTP adequately controlled for confounding occupational exposures and personal habits such as cigarette smoking and alcohol consumption. A few epidemiology studies have suggested a possible association between sulfuric acid exposure and laryngeal or lung cancer; however, in all these studies, workers were exposed to many other chemicals, some of which are recognized carcinogens, such as diethylsulfate and nickel. Considering the multiple chemical factors involved, the IARC/IARC and NTP classifications likely reflect the totality of evidence available at present.
exposures and other limitations of the studies, we disagree with IARC's conclusion that a cause and effect relationship between cancer and "occupational exposure to strong inorganic acid mist containing sulfuric acid" has been demonstrated. Also more recent epidemiological studies have failed to find any association between "occupational exposure to strong inorganic acid mist containing sulfuric acid" and laryngeal or lung cancer. ACGIH has classified "sulfuric acid as contained in strong inorganic acid mists" as a suspect human carcinogen. This classification does not apply to sulfuric acid per se. Lifetime animal studies in hamsters, rats and guinea pigs were conducted in the 1970's under sponsorship of the Environmental Protection Agency (EPA) or the National Institutes of Environmental Health Sciences (NIEHS). All three lifetime studies were negative for carcinogenic effects. These studies were not formally published by the government agencies because they were satisfied that sulfuric acid mist was not a carcinogenic problem. Because these studies were not published, IARC or NTP did not consider them in their deliberations.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:
Ecotoxicological Information and Interpretation:
The toxicity of sulfuric acid to fish is dependent on the resulting pH of the water. Lethality at a pH of 5.0 or below, required to cause lethality varies depending on the hardness of the water (hard water has some buffering capacity) and the species of fish (some fish are more resistant to the effects of acidity). McKee, JE, and Wolf, HA (Editors), Water Quality Criteria, 2nd ed., Publication No. 3-A, p. 279, California State Water Resources Control Board, Sacramento, CA (rev. 1963).

Chemical Fate Information:
No data found for product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.

Container Handling and Disposal:
Rinse containers before disposal.

EPA Hazardous Waste - YES

EPA RCRA HAZARDOUS WASTE CODES:
"C" Corrosive; "R" Reactive.

14. TRANSPORTATION INFORMATION

Transportation Status: IMPORTANT! Statements below provide additional data on listed DOT classification.
The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

US Department of Transportation
http://rio/msds/files/0000124260000100010076E00017.HTM
15. REGULATORY INFORMATION

Inventory Status

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<th>Inventory</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>UNITED STATES (TSCA)</td>
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<tr>
<td>CANADA (DSL)</td>
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<tr>
<td>EUROPE (EINECS/ELINCS)</td>
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<tr>
<td>AUSTRALIA (AICS)</td>
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<tr>
<td>JAPAN (MITI)</td>
<td>Y</td>
</tr>
<tr>
<td>SOUTH KOREA (KECL)</td>
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</tr>
</tbody>
</table>

Y = All ingredients are on the inventory.
E = All ingredients are on the inventory or exempt from listing.
P = One or more ingredients fall under the polymer exemption or are on the no longer polymer list. All other ingredients are on the inventory or exempt from listing.
N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing.

FEDERAL REGULATIONS

Inventory Issues:
All functional components of this product are listed on the TSCA Inventory.

SARA Title III Hazard Classes:
- Fire Hazard: NO
- Reactive Hazard: YES
- Release of Pressure: NO
- Acute Health Hazard: YES
- Chronic Health Hazard: NO

SARA 313 Chemicals
SULFURIC ACID (114.6%)

SARA Extremely Hazardous Substances (EHS)/CERCLA Hazardous Substances

<table>
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<tr>
<th>Ingredient</th>
<th>CERCLA/SARA RQ</th>
<th>SARA EHS TPQ</th>
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</thead>
<tbody>
<tr>
<td>SULFURIC ACID</td>
<td>1000 lbs</td>
<td>1000 lbs</td>
</tr>
<tr>
<td>SULFUR TRIOXIDE</td>
<td></td>
<td>100 lbs</td>
</tr>
<tr>
<td>UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF</td>
<td></td>
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<tr>
<td>CORROSIVITY</td>
<td>100 lbs</td>
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<tr>
<td>UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF</td>
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<tr>
<td>REACTIVITY</td>
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STATE REGULATIONS:
This product contains the following components that are regulated under California Proposition 65:

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Cancer List</th>
<th>Reprod. List</th>
<th>No Sign. Risk Lvl (ug/day) California</th>
<th>Risk Lvl (ug/day) RPI</th>
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</thead>
<tbody>
<tr>
<td>OCCUPATIONAL EXPOSURES TO STRONG-INORGANIC-AC ID MISTS CONTAINING SULFU</td>
<td>Y</td>
<td>N</td>
<td>ND</td>
<td>ND</td>
</tr>
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</table>

16. OTHER INFORMATION

National Fire Protection Association Hazard Ratings--NFPA(R):
3 Health Hazard Rating--Serious
0 Flammability Rating--Minimal
2 Instability Rating--Moderate
0 * NO WATER

National Paint & Coating Hazardous Materials Identification System--HMIS(R):
3 Health Hazard Rating--Serious
0 Flammability Rating--Minimal
2 Reactivity Rating--Moderate

Reason for Revisions:
New product MSDS.

Key Legend Information:
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer
ND - Not determined
RHODIA - Rhodia Established Exposure Limits

Disclaimer:
The information herein is given in good faith but no warranty, expressed or implied, is made.

** End of MSDS Document **