Section 1 - Product and Company Information

Product Name                  SULFURIC ACID FUMING, WITH APPROX. 20 %
Product Number               30736
Brand                        SIAL
Company                      Sigma-Aldrich Canada, Ltd
Address                      2149 Winston Park Drive
                              Oakville ON L6H 6J8 CA
Technical Phone:             9058299500
Fax:                         9058299292
Emergency Phone:             800-424-9300

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID, FUMING</td>
<td>8014-95-7</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula         H2O4S
Synonyms        Disulphuric acid * Dithionic acid * Fuming sulfuric acid * Oleum * Pyrosulphuric acid *
                              Sulfuric acid fuming * Sulfuric acid mixture with sulfur trioxide
RTECS Number:   WS5605000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Corrosive.
Reacts violently with water. Toxic by inhalation. Causes severe burns.
Target organ(s): Teeth. Cardiovascular system.

HMIS RATING
HEALTH: 3*
FLAMMABILITY: 0
REACTIVITY: 2

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 2

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
Do not induce vomiting. If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.
INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

CONDITIONS OF FLAMMABILITY
May react with metals, releasing flammable hydrogen gas.

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Do not use water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions. Water reactive material.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Ventilate area and wash spill site after material pickup is complete. Absorb on sand or vermiculite and place in closed containers for disposal.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.
Incompatible Materials: Do not allow contact with water
SPECIAL REQUIREMENTS
Very hygroscopic.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK - P3 (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.
Other: Faceshield (8-inch minimum).

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>TWA</td>
<td>1 MG/M3</td>
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</table>

Section 9 - Physical/Chemical Properties

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<th>Value</th>
<th>At Temperature or Pressure</th>
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<tr>
<td>Molecular Weight</td>
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<tr>
<td>pH</td>
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<td></td>
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<tr>
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<td></td>
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<tr>
<td>MP/MP Range</td>
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<tr>
<td>Freezing Point</td>
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<tr>
<td>Vapor Pressure</td>
<td>2 mmHg</td>
<td>25 °C</td>
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<tr>
<td>Vapor Density</td>
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<tr>
<td>Saturated Vapor Conc.</td>
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<tr>
<td>SG/Density</td>
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<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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<td>Volatile%</td>
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<tr>
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<tr>
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<tr>
<td>Solvent Content</td>
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<td>Evaporation Rate</td>
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<td>Viscosity</td>
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<tr>
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<td>Flash Point</td>
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<tr>
<td>Optical Rotation</td>
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</table>
Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Metals, Water, Acetaldehyde, Acetonitrile, alkyl nitrates 1-chloro-2,3-epoxypropane, mercury nitride, nitramide, N-nitromethylamine, poly(silylene), sodium thiocyanate 1,2,4,5-tetrazine, zinc iodide, metal perchlorates, bromine pentafluoride, Metal acetylides or carbides Metal chlorates, Nitromethane, Permanganates, Phosphorous oxides, Sodium, Potassium, Acrylonitrile, 2-cyano-2-propanol, cyclopentadiene 1,3-diazidobenzene

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Sulfur oxides.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes severe burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes severe burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: Ingestion can cause immediate burning pain in the mouth, throat, abdomen; severe swelling of the larynx and skeletal paralysis affecting the ability to breathe, circulatory shock and convulsions. May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Lungs. Teeth.

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Pulmonary edema. Effects may be delayed. Exposure may cause:
Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

TOXICITY DATA

Inhalation
Rat
347 ppm
LC50

CHRONIC EXPOSURE - CARCINOGEN

Result: The International Agency for Research on Cancer (IARC) has determined that occupational exposure to
strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1).

IARC CARCINOGEN LIST

Rating: Group 1

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Sulfuric acid, fuming [with less than 30 percent free sulfur trioxide]
UN#: 1831
Class: 8
Packing Group: Packing Group I
Hazard Label: Corrosive
PIH: Not PIH

IATA

Proper Shipping Name: Sulphuric acid, fuming
IATA UN Number: 1831
Hazard Class: 8
Packing Group: I
Not Allowed - Aircraft: Not permitted for air transport.

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: C
Indication of Danger: Corrosive.
R: 14-35-37
Risk Statements: Reacts violently with water. Causes severe burns. Irritating to respiratory system.
S: 26-30-45
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Never add water to this product. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive.
Risk Statements: Reacts violently with water. Toxic by inhalation. Causes severe burns.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Never add water to this product. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
US Statements: Target organ(s): Teeth. Cardiovascular system.
UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

CANADA REGULATORY INFORMATION
WHMIS Classification: 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.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
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. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.