SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Trade Name: 77 % - 100 % Sulfuric Acid
Product Code: None
Manufacturers/Distributors: NorFalco Inc., 6000 Lombardo Center, The Genesis Blg, Suite 650 Seven Hills, OH 44131
NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2
Information Contact: André Auger, Administration Assistant
Product Information: 1-905-542-6901 (Mississauga)
Phone Number (Transportation Emergency): Canada 1-877-ERP-ACID (377-2243)
Phone Number (Transportation Emergency): U.S.A. 1-800-424-9300 CHEMTREC
Phone Number (Medical Emergency): 1-418-656-8090
Phone Number (Emergency): CANUTEC 1-613-996-6666
Synonyms: Dihydrogen Sulfate ; Oil of Vitriol ; Vitriol Brown Oil ; Sulphuric Acid.
Name / Chemical Formula: Sulfuric Acid / H₂SO₄
Chemical Family: Acid
Utilization: Chemical industries ; Water treatment ; Fertilizer ; Pulp and Paper.
Manufacturers: CEZinc on behalf of Noranda Income Limited Partnership, Salaberry-de-Valleyfield (Quebec) Canada J6T 6L4
Xstrata Copper, Horne Smelter, Rouyn-Noranda (Quebec) J9X 5B6
Xstrata Zinc, Brunswick Smelting, Belledune, New Brunswick E0B 1G0
Xstrata Copper, Kidd Metallurgical Division, Timmins, Ontario P4N 7K1
Xstrata Nickel, Sudbury Operations, Falconbridge, Ontario P0M 1S0

SECTION 2. HAZARDS IDENTIFICATION

WHMIS (Canada): CLASS D-1A : Very toxic material causing immediate and serious effects
CLASS E : Corrosive material
Labelling (EEC): C Corrosive

Other hazards: Danger. Extremely corrosive. Causes severe burns and eye damage. Mist : Causes respiratory irritation. Harmful if inhaled. Harmful or fatal if swallowed.

Environmental hazards: Strong acid. Highly toxic to plants and to aquatic organisms.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
<th>Percentage (%)</th>
<th>EC No</th>
<th>R Phrases¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric (Acid)</td>
<td>7664-93-9</td>
<td>77 % to 100 %</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>60 Deg Technical</td>
<td>7664-93-9</td>
<td>77.7</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>66 Deg or 93% Technical</td>
<td>7664-93-9</td>
<td>93.2</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>1.835 Electrolyte</td>
<td>7664-93-9</td>
<td>93.2</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>98 % Technical</td>
<td>7664-93-9</td>
<td>98</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>99 % Technical</td>
<td>7664-93-9</td>
<td>99</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>100 % Technical</td>
<td>7664-93-9</td>
<td>100</td>
<td>231-639-5</td>
<td>R35</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>0-22</td>
<td>231-791-2</td>
<td>-</td>
</tr>
</tbody>
</table>

Note 1: See section 15 for the complete wording of risk phrases.

SECTION 4. FIRST-AID MEASURES

Eye Contact: Remove contact lenses if present. Immediately flush eyes with plenty of water, holding eyelids open for at least 15 minutes. Consult a physician. If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid. Possibility of conjunctivitis, severe irritation, severe burns, permanent eye damage.

Skin Contact: Remove contaminated clothing and shoes as quickly as possible protecting your hands and body. Place under a deluge shower for 15 minutes. Flush exposed skin gently and thoroughly with running water (Pay particular attention to : Folds, crevices, creases, groin). Call a physician if irritation persists. May irritate skin, cause burns (Highly corrosive) and possibility of some scarring. Wash contaminated clothing before reusing. While the patient is being transported to a medical facility, continue the application of cold, wet compresses. If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid. Creams or ointments SHOULD NOT be applied before or during the washing phase of treatment.

Inhalation: Take precautions to avoid secondary contamination by residual acids. Remove the person to fresh air. If not breathing, give artificial respiration. Difficult breathing : Give oxygen. Get immediate medical attention. Possibility...
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77% - 100% SULFURIC ACID

of damage to the upper respiratory tract and lung tissues. Maintain observation of the patient for delayed onset of pulmonary oedema. May cause irritation to the upper respiratory tract: Coughing, sore throat, shortness of breath.

**Ingestion**

DO NOT INDUCE VOMITING. Conscious and alert person: Rinse with water and give ½ to 1 cup of water or milk to dilute material. Spontaneous vomiting: Keep head below hips to prevent aspiration. Rinse mouth and give ½ to 1 cup of water or milk. UNCONSCIOUS person: DO NOT induce vomiting or give any liquid. Immediately obtain medical attention.

**Notes to Physicians**

Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

**SECTION 5. FIRE-FIGHTING MEASURES**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammable Limits</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-Ignition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Products of Combustion</td>
<td>Releases of sulfur dioxide at extremely high temperatures.</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Explosion Hazard</td>
<td>Reacts with most metals, especially when dilute: Hydrogen gas release (Extremely flammable, explosive). Risk of explosion if acid combined with water, organic materials or base solutions in enclosed spaces (Vacuum trucks, tanks). Mixing acids of different strengths/concentrations can also pose an explosive risk in an enclosed space/container.</td>
</tr>
<tr>
<td>Extinguishing media</td>
<td>ERG (Emergency Response Guidebook): Guide 137</td>
</tr>
<tr>
<td></td>
<td>When material is not involved in fire, do not use water on material itself. Small fire: Dry chemical or CO₂. Move containers from fire area if you can do it without risk. Large fire: Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only. Fire involving Tanks or Car/Trailer Loads: Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.</td>
</tr>
<tr>
<td>Protective equipment</td>
<td>Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.</td>
</tr>
</tbody>
</table>

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

| Measures                          | Review Fire and Explosion Hazards and Safety Precautions before proceeding with clean up. Stop flow if possible. Soak up small spills with dry sand, clay or diatomaceous earth. |
| Methods                           | Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs (Based on the sulfuric acid content of the solution spilled). Comply with Federal, State, and local regulations on reporting releases. |

**SECTION 7. HANDLING AND STORAGE**

| Handling                          | DO NOT get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation: Seek medical advice immediately and provide medical personnel with a copy of this SDS. NEVER add water to acid. |
| Conditions for storage            | Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. DO NOT add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to www.norfalco.com. |
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77% - 100% SULFURIC ACID

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>ACGIH (U.S.A.)</th>
<th>OSHA (U.S.A.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric (Acid)</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>60 Deg Technical</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>66 Deg or 93% Technical</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>1,835 Electrolyte</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>98 % Technical</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>99 % Technical</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>100 % Technical</td>
<td>7664-93-9</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

ACGIH : American Conference of Governmental Industrial Hygienists. OSHA : Occupational Safety and Health Administration.

Note : Sulfuric (Acid) : Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours) : 1 mg/m³; IDLH : 15 mg/m³. Consult local authorities for acceptable exposure limits.

Engineering Controls

Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Individual protection

Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, apron, and boots ; Long sleeve wool, acrylic, or polyester clothing ; Acid proof suit and hood ; Appropriate NIOSH respiratory protection.

In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State and Appearance</th>
<th>Liquid (Oily ; Clear to turbid)</th>
<th>Odour</th>
<th>Odourless</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>98.08</td>
<td>Colour</td>
<td>Colourless to light grey</td>
</tr>
<tr>
<td>pH (1% soln/water)</td>
<td>&lt; 1</td>
<td>Volatility</td>
<td>&lt; 1 (Butyl Acetate = 1.0)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>193°C to 327°C (379°F to 621°F) @ 760 mm Hg</td>
<td>Vapour Density</td>
<td>3.4</td>
</tr>
<tr>
<td>Melting Point</td>
<td>-35°C to 11°C (-31°F to 52°F)</td>
<td>Dispersion</td>
<td>Yes (Water)</td>
</tr>
<tr>
<td>Vapour Pressure</td>
<td>&lt; 0.3 mm Hg @ 25°C (77°F)</td>
<td>Solubility</td>
<td>Yes (Water)</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.6 mm Hg @ 38°C (100°F)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRADE</th>
<th>Boiling Point</th>
<th>Freezing Point</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DEG °C</td>
<td>DEG °F</td>
<td>DEG °C</td>
</tr>
<tr>
<td>60 DEG TECHNICAL</td>
<td>193</td>
<td>380</td>
<td>-12</td>
</tr>
<tr>
<td>66 DEG or 93% TECHNICAL</td>
<td>279</td>
<td>535</td>
<td>-35</td>
</tr>
<tr>
<td>1,835 ELECTROLYTE</td>
<td>279</td>
<td>535</td>
<td>-35</td>
</tr>
<tr>
<td>98 % TECHNICAL</td>
<td>327</td>
<td>621</td>
<td>2</td>
</tr>
<tr>
<td>99 % TECHNICAL</td>
<td>310</td>
<td>590</td>
<td>4</td>
</tr>
<tr>
<td>100 % TECHNICAL</td>
<td>274</td>
<td>526</td>
<td>11</td>
</tr>
</tbody>
</table>

SECTION 10. STABILITY AND REACTIVITY

Stability : Yes (Under normal conditions of ambient temperature)
Reactivity : Reacts violently with water, organic substances and base solutions with evolution of heat and hazardous mists.
Conditions to avoid : Sources of ignition, Heat : Possibility of decomposition. Release of toxic gases and vapours (Sulfur oxides SO₂, SO₃)
Polymerization : Polymerization will not occur.
Materials to avoid : Vigorous reactions with : Water; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates ; nitrates ; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides.
Corrosivity : Yes

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry

Ingestion. Inhalation. Skin and eye contacts.
Carcinogenicity : Strong inorganic acid mists containing sulfuric acid (Occupational exposures) : PROVEN (Human, Group 1, IARC) ; SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.
Mutagenicity : Cytogenic analysis : Ovaries 4 mmol/L (Hamster). (RTECS).
### Section 12. Ecological Information

#### Ecotoxicity

<table>
<thead>
<tr>
<th>Toxicity to Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic toxicity: Slightly to moderately toxic.</td>
</tr>
<tr>
<td>Bluegill Sunfish (LC50; 48 hours): 49 mg/l (Tap water, 20 °C, conditions of bioessay not specified). (HSBD).</td>
</tr>
<tr>
<td>Flounder (LC50; 48 hours): 100-330 mg/l (Aerated water, conditions of bioessay not specified). (HSBD).</td>
</tr>
</tbody>
</table>

#### Toxicity to Animals

Toxicity to aquatic life increases with lowering pH. At pH lower than 5, only a few fish species can survive and at pH lower than 4, aquatic life is rare.

- **Eye**: Concentrated compound is corrosive. 10 % solution: Moderate eye irritant.
- **Skin**: Concentrated compound is corrosive. 10 % solution: Slight skin irritant.
- Single and repeated exposure: Irritation of the respiratory tract; Corrosion of the respiratory tract; Lung damage; Labored breathing; Altered respiratory rate; Pulmonary oedema. Repeated exposure: Altered red blood cell count.

#### Mobility (Soil)

Easy soil seeping under rain action

#### Persistence and Degradability

- **Sulfate ion**: Ubiquitous in the environment. Metabolized by micro-organisms and plants.
- **Bioaccumulation**: Sulfate ion: Ubiquitous in the environment. Metabolized by micro-organisms and plants without bioaccumulation.

#### Biodegradation Products

Not available

- **Biodegradation Products (Toxicity)**: Not applicable

#### Remarks on Environment

Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.

### Section 13. Disposal Considerations

**Disposal methods**

Cleaned-up material may be an hazardous waste on Resource Conservation and Recovery Act (RCRA) on disposal due to the corrosivity characteristic. DO NOT flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

### Section 14. Transport Information

#### TDG (Canada)

CLASS 8 Corrosives

#### UN1830 SULFURIC ACID

PG II

#### DOT (U.S.A./IMO (Maritime))

Proper Shipping Name: SULFURIC ACID

Hazard Class: 8

UN Nº: 1830
NorFalco Inc.
NorFalco Sales Inc.

DOT/IMO Label: CORROSIVE
Packing Group: II
Reportable Quantity: 1000 lbs (454 kg)
Shipping Containers: Tank Cars, Tank Trucks, Vessel
Guide 137

SECTION 15. REGULATORY INFORMATION

Labelling (EEC)
- Sulfuric Acid (Acid): C Corrosive (Pictogram)
- Annex I Index number: 016-020-00-0; EU Consolidated Inventories: EC Number 231-639-5
- C ≥ 15 %: C; R35: S2, 26, 30, 45.

Risk Phrases (EEC)
- R35: Causes severe burns

Safety Phrases (EEC)
- S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
- S30: Never add water to this product
- S36/37/39: Wear suitable protective clothing, gloves and eye/face protection
- S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CEPA DSL (CANADA)
- CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): On the Domestic Substances List (DSL): Acceptable for use under the provisions of CEPA.
- Sulfuric Acid is a Class B Drug Precursor under Health Canada's Controlled Drugs and Substances Act and Precursor Control Regulations.

Regulations (U.S.A.)
- CERCLA Section 103 Hazardous substances (40 CFR 302.4): SARA Section 302 Extremely Hazardous Substances (40 CFR 355): Yes; SARA Section 313, Toxic Chemicals (40 CFR 372.65): US; TSCA Inventory: Listed: Sulfuric Acid (Final RQ): 1,000 pounds (454 kg)
- Sulfuric Acid is subject to reporting requirements of Section 313, Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), 40 CFR Part 372.
- For more information call the SARA Hotline 800-424-9346.
- Strong Inorganic Acid Mists Containing Sulfuric Acid: Chemical listed effective March 14, 2003 to the State of California, Proposition 65.
- U.S. FDA Food Biotechnology Regulations: These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing.
- Sulfuric Acid is a Class B Drug Precursor under Health Canada's Controlled Drugs and Substances Act and Precursor Control Regulations.

Classifications HCS (U.S.A.)
- Corrosive liquid

NFPA (National Fire Protection Association) (U.S.A.)
- Fire Hazard 0
- Reactivity 2
- Health 3
- Special Hazard
- ACID

SECTION 16. OTHER INFORMATION

References
- TLVs and BEIs (2009). Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical
  - ACGIH, Cincinnati, OH – http://www.acgih.org
  - CSST (2009) - Commission de la Santé et de la Sécurité du Travail (Québec). Service du répertoire toxicologique -
    http://www.reptox.csst.qc.ca/
  of Communications and Transportation of Mexico
- HSDB (2009) - Hazardous Substances Data Bank. TOXNET® Network of databases on toxicology, hazardous chemicals, and
  environmental health. NLM Databases & Electronic Resources, U.S., National Library of Medicine, NHI, 8600 Rockville Pike,
- EIS (Classification and Labelling), substances or preparations in accordance with Directive 67/548/EEC (substances) and
  1999/45/EC (preparations),
- EIS : EINECS (European Inventory of Existing Commercial chemical Substances) O.J. C 146A, 15.6.1990
Glossary

CSST  : Commission de la Santé et de la Sécurité du Travail (Québec).
HSDB  : Hazardous Substances Data Bank.
IARC  : International Agency for Research on Cancer.
NIOSH : National Institute of Occupational Safety and Health.
NTP   : U.S. National Toxicology Program.
RTECS : Registry of Toxic Effects of Chemical Substances

Note

For further information, see NorFalco Inc. Sulfuric Acid « Storage and Handling Bulletin ». Because of its corrosive characteristics and inherent hazards, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

For additional information, please visited our website:  www.norfalco.com

Written by: Groupe STEM Consultants / NorFalco Sales Inc.

Complete revision: 2010-01-24  Partial review: None  Previous complete revision: 2009-01-24

Verified by: Guy Desgagnés and Eric Kuraitis, Technical Representative - Sulfuric Acid

Request to: André Auger, Administration Assistant  Tel: (905) 542-6901 extension 0  Fax: (905) 542-6914 / 6924
NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2

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