



Safety Data Sheet

Section 1: Identification

Product identifier

Product Name • Ferrous Sulfate Solution

Synonyms • Iron (II) Sulfate

Molecular Formula • FeSO₄

• Trade Names: Ferrous Sulfate 5%; Ferrous Sulfate 7%; 25% Ferrous Sulfate; 35% Ferrous Sulfate.

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Water and Wastewater Treatment

Details of the supplier of the safety data sheet

Manufacturer • ALTIVIA Chemicals, LLC
1100 Louisiana Street, Suite 4800
Houston, TX 77002
United States
www.altivia.com
customerservice@altivia.com

Telephone • (713) 658-9000
(General)

Emergency telephone number

Manufacturer • (800) 424-9300 - CHEMTREC for Transportation Emergencies: Account # CCN 1045

Section 2: Hazard Identification

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Corrosive to Metals 1
Acute Toxicity Oral 4

Label elements

OSHA HCS 2012

WARNING



Hazard statements • May be corrosive to metals
Harmful if swallowed

Precautionary statements

Prevention • Keep only in original container.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response • Absorb spillage to prevent material damage.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.

Storage/Disposal • Store in corrosive resistant/ container with a resistant inner liner.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Other hazards

OSHA HCS 2012 • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Section 3 - Composition/Information on Ingredients

Substances

• Material does not meet the criteria of a substance.

Mixtures

| Composition | | | | | |
|-----------------|---------------|------------|---|---|----------|
| Chemical Name | Identifiers | % | LD50/LC50 | Classifications According to Regulation/Directive | Comments |
| Ferrous Sulfate | CAS:7720-78-7 | 20% TO 40% | Ingestion/Oral-Rat LD50 • 319 mg/kg | OSHA HCS 2012: Acute Tox. 4 (Orl) | NDA |
| Sulfuric acid | CAS:7664-93-9 | < 0.25% | Inhalation-Rat LC50 • 510 mg/m ³ Ingestion/Oral-Rat LD50 • 2140 mg/kg | OSHA HCS 2012: Eye Dam. 1; Skin Corr. 1B | NDA |

Section 4: First-Aid Measures

Description of first aid measures

Inhalation • Move victim to fresh air. Administer oxygen if breathing is difficult. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give artificial respiration if victim is not breathing. Get medical attention immediately.

- Skin** • For minor skin contact, avoid spreading material on unaffected skin. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Remove and isolate contaminated clothing. Get medical attention immediately.
- Eye** • In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Get medical attention immediately.
- Ingestion** • If swallowed, rinse mouth with water (only if the person is conscious) Do NOT induce vomiting. Do not use mouth-to-mouth method if victim ingested the substance. Obtain medical attention immediately if ingested.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

- 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.

Section 5: Fire-Fighting Measures

Extinguishing media

- Suitable Extinguishing Media** • LARGE FIRES: Dry chemical, CO2, alcohol-resistant foam or water spray.
SMALL FIRES: Dry chemical, CO2 or water spray.

- Unsuitable Extinguishing Media** • No data available

Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards** • Containers may explode when heated.

- Hazardous Combustion Products** • Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive fumes.

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
SMALL FIRES: Move containers from fire area if you can do it without risk.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

- Personal Precautions** • Ventilate enclosed areas. Do not walk through spilled material. Use appropriate Personal Protective Equipment (PPE) Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

- Emergency Procedures** • ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Do not get water inside container.

Environmental precautions

- Avoid run off to waterways and sewers.

Methods and material for containment and cleaning up

Containment/Clean-up Measures • Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Section 7 - Handling and Storage

Precautions for safe handling

Handling • Review the label, this SDS and any other applicable information before use. Handle and open container with care. Use only with adequate ventilation. Keep separated from incompatible substances. Use appropriate Personal Protective Equipment per Section 8. Handle only with equipment, materials and supplies specified by their manufacturer as being compatible and appropriate for use with this product. Do not get in eyes. Avoid contact with skin. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Conditions for safe storage, including any incompatibilities

Storage • Prevent material from coming in contact with common metals. Ensure that all storage vessels are labeled. Store only in dry rubber-lined, plastic, FRP (fiberglass) or stainless steel (304,316) Keep storage temperatures between 10° and 40°C Store away from incompatible materials such as alkalis. Keep smaller containers (drums and totes) tightly closed when not in use or when empty. Product should be used within one year. Storage facilities should have secondary containment as required by law or regulation. Storage tanks, piping and offloading points should be labeled with appropriate signage to avoid accidents. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

Section 8 - Exposure Controls/Personal Protection

Control parameters

| Exposure Limits/Guidelines | | | | |
|----------------------------|--------|-----------------------------------|-------------|-------------|
| | Result | ACGIH | NIOSH | OSHA |
| Sulfuric acid (7664-93-9) | TWAs | 0.2 mg/m3 TWA (thoracic fraction) | 1 mg/m3 TWA | 1 mg/m3 TWA |

Exposure controls

Engineering Measures/Controls • Good general ventilation 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

Respiratory • In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face • Wear protective eyewear (goggles, face shield, or safety glasses).

Skin/Body • Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls • Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description

Ferrous Sulfate Solution

| | | | |
|-------------------------------------|--|------------------------------|---|
| Physical Form | Liquid | Appearance/Description | Green to blue colored liquid with an acidic odor. |
| Color | Green to blue. | Odor | Acidic Odor. |
| Odor Threshold | No data available | | |
| General Properties | | | |
| Boiling Point | 105 to 110 °C(221 to 230 °F) | Melting Point/Freezing Point | No data available |
| Decomposition Temperature | > 300 °C(> 572 °F) | pH | > 2 |
| Specific Gravity/Relative Density | 1.12 to 1.22 @ 25 °C(77 °F) Water=1 | Water Solubility | Appreciable 10 to 99 % |
| Viscosity | No data available | | |
| Volatility | | | |
| Vapor Pressure | No data available | Vapor Density | No data available |
| Evaporation Rate | Similar to water | | |
| Flammability | | | |
| Flash Point | None | UEL | None |
| LEL | None | Autoignition | None |
| Flammability (solid, gas) | None | | |
| Environmental | | | |
| Octanol/Water Partition coefficient | None | | |

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- Excess heat.

Incompatible materials

- Carbon Steel, Brasses, Aluminum, & Nylon.

Hazardous decomposition products

- Thermal decomposition; after completely dry and heated to decomposition will produce oxides and sulfur.

Section 11 - Toxicological Information

Information on toxicological effects

Other Material Information • Although Ferrous Sulfate is manufactured with the use of Sulfuric Acid, the residual amount of sulfuric acid is less than 0.25% active in the finished Ferrous Sulfate product. The following statements in regards to Sulfuric Acid are indicative of concentrated acid level of greater than 5% and are not anticipated as potential health effects of the Sulfuric Acid concentrations in the finished product known as Ferrous Sulfate.

| Components | |
|-------------------------|--|
| Sulfuric acid (< 0.25%) | 7664-93-9 Acute Toxicity: Ingestion/Oral-Rat LD50 • 2140 mg/kg; Inhalation-Rat LC50 • 510 mg/m ³ ; Irritation: Eye-Rabbit • 5 mg 30 Second(s)-Rinse • Severe irritation; Multi-dose Toxicity: Inhalation-Rat TClO • 0.2 mg/m ³ 6 Hour(s) 4 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Other changes</i> ; Mutagen: Cytogenetic analysis • Unreported Route-Hamster • Ovary (Somatic cell) • 4 mmol/L; Reproductive: Inhalation-Rabbit TClO • 20 mg/m ³ 7 Hour(s)(6-18D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i> |

Ferrous Sulfate Solution

| | | |
|------------------------------|-----------|---|
| Ferrous Sulfate (20% TO 40%) | 7720-78-7 | Acute Toxicity: Ingestion/Oral-Rat LD50 • 319 mg/kg; Mutagen: Micronucleus test • Ingestion/Oral-Mouse • 33.2 mg/kg; DNA damage • Ingestion/Oral-Mouse • 33.2 mg/kg; Reproductive: Ingestion/Oral-Rat TDLo • 7200 mg/kg (9-14D preg); <i>Reproductive Effects: Effects on Embryo or Fetus: Fetal death</i> |
|------------------------------|-----------|---|

| GHS Properties | Classification |
|-------------------------------|---|
| Acute toxicity | OSHA HCS 2012 •Acute Toxicity - Oral 4 - ATEmix (oral) = 798 mg/kg |
| Skin corrosion/Irritation | OSHA HCS 2012 •No data available |
| Serious eye damage/Irritation | OSHA HCS 2012 •No data available |
| Skin sensitization | OSHA HCS 2012 •No data available |
| Respiratory sensitization | OSHA HCS 2012 •No data available |
| Aspiration Hazard | OSHA HCS 2012 •No data available |
| Carcinogenicity | OSHA HCS 2012 •No data available |
| Germ Cell Mutagenicity | OSHA HCS 2012 •No data available |
| Toxicity for Reproduction | OSHA HCS 2012 •No data available |
| STOT-SE | OSHA HCS 2012 •No data available |
| STOT-RE | OSHA HCS 2012 •No data available |

Potential Health Effects

Inhalation

Acute (Immediate) • Concentrated sulfuric acid can be corrosive to the nose, mucous membranes, and respiratory tract. Inhalation of the vapors or mist can cause pulmonary edema, emphysema or permanent changes in pulmonary function.

Chronic (Delayed) • No data available

Skin

Acute (Immediate) • Sulfuric acid is corrosive to the skin.

Chronic (Delayed) • No data available

Eye

Acute (Immediate) • Sulfuric acid is corrosive to the eyes.

Chronic (Delayed) • No data available

Ingestion

Acute (Immediate) • Harmful if swallowed. Concentrated sulfuric acid can be corrosive to the gastrointestinal tract.

Chronic (Delayed) • No data available

Other

Chronic (Delayed) • Chronic exposure to sulfuric acid has been reported to be associated with dermatitis, chronic bronchitis, gastritis, erosion of dental enamel, conjunctivitis, increased frequency of respiratory tract infections and cancer of the larynx, lungs and upper respiratory tract.

Carcinogenic Effects • The International Agency for Research on Cancer (IARC) has classified “strong inorganic acid mists containing sulfuric acid” as a known human carcinogen (Category 1). This classification is for inorganic acid mists only and does not apply to sulfuric acid or sulfuric acid solutions. The basis for the IARC classification rests on several epidemiology studies which have several deficiencies. These studies did not account for exposure to other substances, some known to be animal or potential human carcinogens, social influences (smoking or alcohol consumption) and included small numbers of subjects. Based on the overall weight of evidence from all human and chronic animal studies, no definitive causal relationship between sulfuric acid mist exposure and respiratory tract cancer has been shown.

Key to abbreviations

LC = Lethal Concentration
 LD = Lethal Dose
 TC = Toxic Concentration
 TD = Toxic Dose

Section 12 - Ecological Information

Toxicity

• Non-mandatory section - information about this substance not compiled.

Persistence and degradability

• Non-mandatory section - information about this substance not compiled.

Bioaccumulative potential

• Non-mandatory section - information about this substance not compiled.

Mobility in Soil

• Non-mandatory section - information about this substance not compiled.

Other adverse effects

• Non-mandatory section - information about this substance not compiled.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

| | UN number | UN proper shipping name | Transport hazard class(es) | Packing group | Environmental hazards |
|-----|-----------|--|----------------------------|---------------|-----------------------|
| DOT | UN3264 | Corrosive liquid, acidic, inorganic, n.o.s. (contains Ferrous Sulfate) | 8 | III | NDA |

Special precautions for user • None specified.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • No data available

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

• Acute

| Inventory | | |
|-----------------|-----------|------|
| Component | CAS | TSCA |
| Ferrous Sulfate | 7720-78-7 | Yes |
| Sulfuric acid | 7664-93-9 | Yes |

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - OSHA - Specifically Regulated Chemicals

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

| | | |
|------------------|-----------|-----------------------------------|
| •Ferrous Sulfate | 7720-78-7 | 1000 lb final RQ; 454 kg final RQ |
| •Sulfuric acid | 7664-93-9 | 1000 lb final RQ; 454 kg final RQ |

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

| | | |
|------------------|-----------|------------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | 1000 lb EPCRA RQ |

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPOs

| | | |
|------------------|-----------|-------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | 1000 lb TPO |

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

| | | |
|------------------|-----------|---|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | 1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size) |

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - California - Proposition 65 - Developmental Toxicity

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

| | | |
|------------------|-----------|------------|
| •Ferrous Sulfate | 7720-78-7 | Not Listed |
| •Sulfuric acid | 7664-93-9 | Not Listed |

Ferrous Sulfate Solution

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

- Ferrous Sulfate
- Sulfuric acid

| | |
|-----------|------------|
| 7720-78-7 | Not Listed |
| 7664-93-9 | Not Listed |

Section 16 - Other Information

Revision Date • 05/March/2019

Preparation Date • 04/March/2016

Disclaimer/Statement of Liability • The technical data given herein 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 guidance for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. No guarantee is being given as to the end use performance. The product is sold on the basis that buyers test the product for their specific purposes. This information related to the material designated and may not be valid for such material used in combination with any other materials or in any process.

Key to abbreviations

NDA = No data available