SECTION 1: Identification

1.1. Identification
Product form : Substance
Substance name : Zinc Sulfate Monohydrate
CAS-No. : 7446-19-7
Formula : ZnSO₄ • H₂O

1.2. Recommended use and restrictions on use
Use of the substance/mixture : Nutrient; Dietary Supplement

1.3. Supplier
Manufacturer
Jost Chemical Co.
8150 Lackland Rd.
Saint Louis, Missouri 63114
T 314-428-4300 - F 314-428-4366
sds@jostchemical.com - www.jostchemical.com

1.4. Emergency telephone number
Emergency number : For Hazardous Materials [or Dangerous Goods] Incident Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
United States and Canada: 1-800-424-9300 / +1 703-527-3887
Global: +1 703-741-5970

SECTION 2: Hazard(s) Identification

2.1. Classification of the substance or mixture
GHS-US classification
Acute toxicity (oral) H302 Harmful if swallowed
Category 4
Serious eye damage/eye irritation Category 1 H318 Causes serious eye damage
Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements
GHS-US labeling
Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger
Hazard statements (GHS-US) : H302 - Harmful if swallowed
H318 - Causes serious eye damage
Precautionary statements (GHS-US) : P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear protective gloves, eye protection.
P301+P312 - If swallowed: Call a doctor if you feel unwell
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a doctor
P330 - Rinse mouth.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

2.3. Other hazards which do not result in classification
Other hazards not contributing to the classification : None under normal conditions.

2.4. Unknown acute toxicity (GHS US)
Not applicable
SECTION 3: Composition/Information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc Sulfate Monohydrate</td>
<td>(CAS-No.) 7446-19-7</td>
<td>100</td>
<td>Acute Tox. 4 (Oral), H302 Eye Dam. 1, H318</td>
</tr>
</tbody>
</table>

Substance type: Mono-constituent

Full text of hazard classes and H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures


First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

First-aid measures after skin contact: Rinse with water. Do not apply (chemical) neutralizing agents. Take victim to a doctor if irritation persists. Wash skin with plenty of water.

First-aid measures after eye contact: Rinse immediately with plenty of water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Do not apply neutralizing agents. Take victim to an ophthalmologist. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.


4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms: Harmful if swallowed. Causes serious eye damage.

Symptoms/effects after inhalation: Coughing. Dry/sore throat. Respiratory difficulties.

Symptoms/effects after skin contact: No effects known.

Symptoms/effects after eye contact: Corrosion of the eye tissue. Visual disturbances. Serious damage to eyes.


Chronic symptoms: No effects known.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media


5.2. Specific hazards arising from the chemical

Fire hazard: DIRECT FIRE HAZARD: Non combustible.

Explosion hazard: DIRECT EXPLOSION HAZARD: No direct explosion hazard.

Reactivity: Reacts violently with (strong) bases.

5.3. Special protective equipment and precautions for fire-fighters

Precautionary measures fire: Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: have neighborhood close doors and windows.

Firefighting instructions: Dilute toxic gases with water spray. Take account of toxic/corrosive precipitation water. Take account of environmentally hazardous firefighting water. Use water moderately and if possible collect or contain it.
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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Emergency procedures: Ventilate spillage area. Mark the danger area. Prevent dust cloud formation. No naked flames. Wash contaminated clothes. Avoid contact with skin and eyes.
Measures in case of dust release: In case of dust production: keep upwind. Dust production: have neighborhood close doors and windows.

6.1.2. For emergency responders
Protective equipment: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions
Avoid release to the environment. Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up
For containment: Contain released product, pump into suitable containers. Plug the leak, cut off the supply. Dam up the solid spill. Knock down/dilute dust cloud with water spray.
Methods for cleaning up: Mechanically recover the product. Stop dust cloud by covering with sand/earth. Scoop solid spill into closing containers. Carefully collect the spill/leftovers. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

Other information: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections
For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling: Ensure good ventilation of the work station. Avoid raising dust. Keep away from naked flames/heat. Carry operations in the open/under local exhaust/ventilation or with respiratory protection. Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Avoid contact with skin and eyes. Wear personal protective equipment.
Hygiene measures: Observe strict hygiene. Keep container tightly closed. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Store in a clean, dry warehouse in the original unopened containers.
Heat-ignition: KEEP SUBSTANCE AWAY FROM: heat sources.
Information on mixed storage: KEEP SUBSTANCE AWAY FROM: (strong) bases. water/moisture.
Storage area: Store at ambient temperature. Store in a dry area. Keep container in a well-ventilated place. Meet the legal requirements.
Special rules on packaging: SPECIAL REQUIREMENTS: closing. watertight. dry. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.
Packaging materials: lead.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available

8.2. Appropriate engineering controls
Appropriate engineering controls: Ensure good ventilation of the work station.
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Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Materials for protective clothing:
GIVE GOOD RESISTANCE: butyl rubber. PVC

Hand protection:
Gloves

Eye protection:
Safety glasses. In case of dust production: protective goggles. Safety glasses

Skin and body protection:
Protective clothing
Respiratory protection:
Dust production: dust mask with filter type P2

Personal protective equipment symbol(s):

SECTION 9: Physical and chemical properties
9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Powder</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>3.7 - 4.07 (Literature, 20 °C)</td>
</tr>
<tr>
<td>Melting point</td>
<td>&gt; 229 °C (1 atm)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Non flammable</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor pressure at 50 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative density</td>
<td>3.35 (22 °C)</td>
</tr>
<tr>
<td>Specific gravity / density</td>
<td>3350 kg/m³ (22 °C)</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>179.47 g/mol</td>
</tr>
<tr>
<td>Solubility</td>
<td>Soluble in water,</td>
</tr>
<tr>
<td>Water: 210 g/l (20 °C)</td>
<td></td>
</tr>
<tr>
<td>Log Pow</td>
<td>Not applicable (inorganic substance)</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>&gt; 229 °C (EU Method A.1: Melting/freezing point)</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
</tbody>
</table>
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Explosion limits : Not applicable
Explosive properties : No data available.
Oxidizing properties : No data available.

9.2. Other information
VOC content : Not applicable (inorganic)
Other properties : Hygroscopic.

SECTION 10: Stability and reactivity

10.1. Reactivity
Reacts violently with (strong) bases.

10.2. Chemical stability
Hygroscopic.

10.3. Possibility of hazardous reactions
No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials
Oxidizing agent.

10.6. Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity (oral) : Oral: Harmful if swallowed.
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

Zinc Sulfate Monohydrate (7446-19-7)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>1710 mg/kg body weight (OECD 401: Acute Oral Toxicity, Rat, Male, Experimental value)</td>
</tr>
<tr>
<td>LD50 dermal rat</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>500 mg/kg body weight</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation : Not classified (Based on available data, the classification criteria are not met)
Serious eye damage/irritation : Causes serious eye damage. (Based on available data, the classification criteria are not met)
Respiratory or skin sensitization : Not classified (Lack of data)
Germ cell mutagenicity       : Not classified (Lack of data)
Carcinogenicity              : Not classified (Lack of data)
Reproductive toxicity        : Not classified (Lack of data)
Specific target organ toxicity – single exposure : Not classified (Lack of data)
Specific target organ toxicity – repeated exposure : Not classified (Lack of data)
Aspiration hazard            : Not classified
                            : (Not applicable)
Viscosity, kinematic         : No data available
Likely routes of exposure    : Skin and eye contact.
Potential Adverse human health effects and symptoms : Harmful if swallowed. Causes serious eye damage.
Symptoms/effects after inhalation : Coughing. Dry/sore throat. Respiratory difficulties.
Symptoms/effects after skin contact : No effects known.
Symptoms/effects after eye contact : Corrosion of the eye tissue. Visual disturbances. Serious damage to eyes.
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### Symptoms/effects after ingestion

|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Chronic symptoms

| : | No effects known. |

### SECTION 12: Ecological information

#### 12.1. Toxicity

<table>
<thead>
<tr>
<th>Ecology - general:</th>
<th>Dangerous for the environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology - water:</td>
<td>Toxic to crustacea. Very toxic to fishes. Inhibition of activated sludge. Toxic to algae. May cause eutrophication at very low concentration. pH shift.</td>
</tr>
</tbody>
</table>

#### Zinc Sulfate Monohydrate (7446-19-7)

| LC50 fish 1 | 0.33 - 0.78 mg/l (96 h, Pimephales promelas, Static system, Fresh water, Experimental value) |
| EC50 Daphnia 1 | 1.13 mg/l (48 h, Ceriodaphnia dubia, Literature study) |

#### 12.2. Persistence and degradability

| Persistence and degradability: Biodegradability: not applicable. |
| Biochemical oxygen demand (BOD): Not applicable (inorganic) |
| Chemical oxygen demand (COD): Not applicable (inorganic) |
| ThOD: Not applicable (inorganic) |

#### 12.3. Bioaccumulative potential

| BCF other aquatic organisms 1 | 38 - 28960 (28 day(s), Palaemon elegans, Semi-static system, Salt water, Read-across, Fresh weight) |
| Log Pow: | Not applicable (inorganic substance) |
| Log Kow: | Not applicable (inorganic substance) |
| Bioaccumulative potential: Bioaccumable. |

#### 12.4. Mobility in soil

| Mobility in soil: No additional information available |
| Ecology - soil: No (test)data on mobility of the substance available. |

#### 12.5. Other adverse effects

| : | No additional information available |

### SECTION 13: Disposal considerations

#### 13.1. Disposal methods

| Regional legislation (waste): LWCA (the Netherlands): KGA category 05. |
| Waste treatment methods: Dispose of contents/container in accordance with licensed collector’s sorting instructions. |
| Product/Packaging disposal recommendations: Do not discharge into drains or the environment. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle/reuse. Remove to an authorized dump (Class I). Precipitate/make insoluble. |

#### Additional information

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**SECTION 14: Transport information**

**Department of Transportation (DOT)**
- **Transport document description**: UN3077 Environmentally hazardous substances, solid, n.o.s., 9, III
- **UN-No.(DOT)**: UN3077
- **Proper Shipping Name (DOT)**: Environmentally hazardous substances, solid, n.o.s.
- **Class (DOT)**: 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140
- **Packing group (DOT)**: III - Minor Danger
- **Hazard labels (DOT)**: 9 - Class 9 (Miscellaneous dangerous materials)

**Dangerous for the environment**: Yes
**Marine pollutant**: Yes

**DOT Packaging Non Bulk (49 CFR 173.xxx)**: 213
**DOT Packaging Bulk (49 CFR 173.xxx)**: 240
**DOT Symbols**: G - Identifies PSN requiring a technical name
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DOT Special Provisions (49 CFR 172.102) : 8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description "Other regulated substances, liquid or solid, n.o.s.", as appropriate. In addition, for solid materials, special provision B54 applies.

146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination.

335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as "Environmentally hazardous substances, solid, n.o.s," UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging.

A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg:

b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2
c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2
d. Fiberboard: 11G
e. Wooden: 11C, 11D and 11F (with inner liners)
f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be silt-proof and water resistant or must be fitted with a silt-proof and water resistant liner).

B54 - Open-top, silt-proof rail cars are also authorized.

IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).

IP3 - Flexible IBCs must be silt-proof and water-resistant or must be fitted with a silt-proof and water-resistant liner.

N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle.

T1 - 1.5 178.274(d)(2) Normal............. 178.275(d)(2)

TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 155

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : No limit

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : No limit

DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

Emergency Response Guide (ERG) Number : 171

Other information : No supplementary information available.

Transportation of Dangerous Goods

Transport by sea

Transport document description (IMDG) : UN 3077 Environmentally hazardous substance, solid, n.o.s. (Zinc Sulfate Monohydrate), 9, III, MARINE POLLUTANT

UN-No. (IMDG) : 3077

Proper Shipping Name (IMDG) : Environmentally hazardous substance, solid, n.o.s.

Class (IMDG) : 9 - Miscellaneous dangerous substances and articles

Packing group (IMDG) : III - substances presenting low danger

Limited quantities (IMDG) : 5 kg

EmS-No. (IMDG) : F-A
Air transport

Transport document description (IATA) : UN 3077 Environmentally hazardous substance, solid, n.o.s. (Zinc Sulfate Monohydrate), 9, III
UN-No. (IATA) : 3077
Proper Shipping Name (IATA) : Environmentally hazardous substance, solid, n.o.s.
Class (IATA) : 9 - Miscellaneous Dangerous Goods
Packing group (IATA) : III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations
Zinc Sulfate Monohydrate (7446-19-7)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory
SARA Section 311/312 Hazard Classes Immediate (acute) health hazard

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory except for:

Zinc Sulfate Monohydrate CAS-No. 7446-19-7 100%

15.2. International regulations
CANADA
No additional information available
EU-Regulations
No additional information available
National regulations
No additional information available

15.3. US State regulations
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Full text of H-phrases:
H302 Harmful if swallowed
H318 Causes serious eye damage
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NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA fire hazard : 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA reactivity : 2 - Materials that readily undergo violent chemical change at elevated temperatures and pressures.

Hazard Rating
Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.