Zinc Sulfate, Monohydrate
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Date of issue: 05/20/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Product form: Substance
Substance name: Zinc Sulfate, Monohydrate
CAS No: 7446-19-7
Formula: ZnSO₄·H₂O
Synonyms: Environmentally hazardous substance, solid, n.o.s. / sulfuric acid, zinc salt (1:1), monohydrate / zinc sulfate monohydrate granular TG / zinc sulfate monohydrate powder refined / zinc sulfate monohydrate powder TG / zinc sulfate monohydrate prilled TG / zinc sulphate, monohydrate
BIG no: 20862

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture: Laboratory chemical
Chemical intermediate

1.3. Details of the supplier of the safety data sheet
Two Rivers Terminal
3300 North Glade Road
Pasco, Wa. 99302 - USA
T 509-547-7776 - F 509-546-9508
www.tworiversterminal.com

1.4. Emergency telephone number
Emergency number: 24 Hour Emergency HAZMAT Response: (800) 229-5252; EPA National Response Center (800) 424-8802

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
Classification (GHS-US)
Acute Tox. 4 (Oral) H302
Eye Dam. 1 H318
Aquatic Acute 1 H400
Aquatic Chronic 1 H410
Full text of H-phrases: see section 16

2.2. Label elements
GHS-US labeling
Hazard pictograms (GHS-US): ![Hazard Pictograms]

Signal word (GHS-US): Danger
Hazard statements (GHS-US): H302 - Harmful if swallowed
H318 - Causes serious eye damage
H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US): P264 - Wash Skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear eye protection, protective gloves
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
P391 - Collect spillage
P501 - Dispose of contents/container to an authorized waste collection point
2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Acute 1, H400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Chronic 1, H410</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : 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.

First-aid measures after eye contact : Rinse immediately with plenty of water for 15 minutes. Do not apply neutralizing agents. Take victim to an ophthalmologist.


4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : AFTER INHALATION OF DUST: Coughing.

Symptoms/injuries after skin contact : Slight irritation.

Symptoms/injuries after eye contact : Irritation of the eye tissue. Visual disturbances.


Chronic symptoms : ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Skin rash/inflammation. Gastrointestinal complaints. Inflammation/damage of the eye tissue.

4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media : EXTINGUISHING MEDIA FOR SURROUNDING FIRES: Adapt extinguishing media to the environment.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Non combustible.

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

Reactivity : On burning: release of toxic and corrosive gases/vapours (sulphur oxides, zinc oxide) and formation of metallic fumes. Reacts violently with (strong) bases.

5.3. Advice for firefighters
Precautionary measures fire : Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: have neighbourhood close doors and windows.

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

**6.1. Personal precautions, protective equipment and emergency procedures**

**6.1.1. For non-emergency personnel**


**Emergency procedures**: Mark the danger area. Prevent dust cloud formation. No naked flames. Wash contaminated clothes.

**Measures in case of dust release**: In case of dust production: keep upwind. Dust production: have neighbourhood close doors and windows.

**6.1.2. For emergency responders**

No additional information available.

**6.2. Environmental precautions**

Prevent soil and water pollution. Prevent spreading in sewers.

**6.3. Methods and material for containment and cleaning up**

**For containment**: Contain released substance, pump into suitable containers. Consult "Material-handling" to select material of 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**: Stop dust cloud by covering with sand/earth. Scoop solid spill into closing containers. See "Material-handling" for suitable container materials. Carefully collect the spill/leftovers. Clean contaminated surfaces with an excess of water. Wash clothing and equipment after handling.

**6.4. Reference to other sections**

No additional information available.

**SECTION 7: Handling and storage**

**7.1. Precautions for safe handling**

Precautions for safe handling: 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 raising dust. Keep away from naked flames/heat. Observe strict hygiene. Keep container tightly closed. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

**7.2. Conditions for safe storage, including any incompatibilities**

**Heat-ignition**: KEEP SUBSTANCE AWAY FROM: heat sources.

**Prohibitions 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**: MATERIAL TO AVOID: lead.

**7.3. Specific end use(s)**

No additional information available.

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

<table>
<thead>
<tr>
<th>Zinc Sulfate, Monohydrate (7446-19-7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
</tr>
<tr>
<td>OSHA</td>
</tr>
</tbody>
</table>

**8.2. Exposure controls**

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

**Hand protection**: Gloves.

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

**Skin and body protection**: Protective clothing.

**Respiratory protection**: Dust production: dust mask with filter type P3.
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>Solid, Powder.</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odourless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>4.0 (5 %)</td>
</tr>
<tr>
<td>pH solution</td>
<td>5 %</td>
</tr>
<tr>
<td>Melting point</td>
<td>238 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>&gt; 500 °C</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>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>2.5</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity / density</td>
<td>2500 kg/m³</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>179.47 g/mol</td>
</tr>
<tr>
<td>Solubility</td>
<td>Soluble in water. Soluble in methanol, Soluble in glycerol. Water: 35 g/100ml</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>&gt; 500 °C</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC content</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Other properties</td>
<td>Hygroscopic. Substance has acid reaction.</td>
</tr>
</tbody>
</table>

SECTION 10: Stability and reactivity

10.1. Reactivity

On burning: release of toxic and corrosive gases/vapours (sulphur oxides, zinc oxide) and formation of metallic fumes. Reacts violently with (strong) bases.

10.2. Chemical stability

Hygroscopic.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

No additional information available
SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Oral: Harmful if swallowed.

<table>
<thead>
<tr>
<th>Zinc Sulfate, Monohydrate (7446-19-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATE US (oral)</td>
<td>500.000 mg/kg body weight</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Not classified

**Zinc Sulfate, Monohydrate (7446-19-7)**

pH: 4.0 (5 %)

Serious eye damage/irritation: Causes serious eye damage.

pH: 4.0 (5 %)

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): Not classified

Specific target organ toxicity (repeated exposure): Not classified

Aspiration hazard: Not classified

Symptoms/injuries after inhalation: AFTER INHALATION OF DUST: Coughing.

Symptoms/injuries after skin contact: Slight irritation.

Symptoms/injuries after eye contact: Irritation of the eye tissue. Visual disturbances.


Chronic symptoms: ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Skin rash/irflammation. Gastrointestinal complaints. Inflammation/damage of the eye tissue.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general: Dangerous for the environment.

Ecology - air: Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).


<table>
<thead>
<tr>
<th>Zinc Sulfate, Monohydrate (7446-19-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
<td>1.7 mg/l (96 h; Poecilia reticulata; Anhydrous form)</td>
</tr>
<tr>
<td>EC50 Daphnia 1</td>
<td>0.56 mg/l (48 h; Daphnia magna; Anhydrous form)</td>
</tr>
<tr>
<td>LC50 fish 2</td>
<td>2.4 mg/l (96 h; Salmo gairdneri (Oncorhynchus mykiss); Anhydrous form)</td>
</tr>
<tr>
<td>EC50 Daphnia 2</td>
<td>1 mg/l (24 h; Daphnia magna; Anhydrous form)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Zinc Sulfate, Monohydrate (7446-19-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
<td>Biodegradability: not applicable.</td>
</tr>
<tr>
<td>Biochemical oxygen demand (BOD)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Chemical oxygen demand (COD)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>ThOD</td>
<td>Not applicable</td>
</tr>
<tr>
<td>BOD (% of ThOD)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Zinc Sulfate, Monohydrate (7446-19-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BCF fish 1</td>
<td>59 - 242 (Cyprinus carpio; Anhydrous form)</td>
</tr>
<tr>
<td>BCF fish 2</td>
<td>59 - 242 (Cyprinus carpio; Test duration: 8 weeks)</td>
</tr>
</tbody>
</table>
Zinc Sulfate, Monohydrate (7446-19-7)

Bioaccumulative potential

Bioaccumable.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations: 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. Precipitate/make insoluble. Remove to an authorized dump (Class I). Treat using the best available techniques before discharge into drains or the aquatic environment.

Additional information: LWCA (the Netherlands): KGA category 05. Hazardous waste according to Directive 2008/98/EC.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated for transport

Additional information

Other information: No supplementary information available.

ADR

Transport document description: UN 3077, 9, III, (E)

Packing group (ADR): III

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

Hazard identification number (Kemler No.): 90

Classification code (ADR): M7

Hazard labels (ADR): 9 - Miscellaneous dangerous compounds

Orange plates:

Tunnel restriction code (ADR): E

Transport by sea

UN-No. (IMDG): 3077

Class (IMDG): 9 - Miscellaneous dangerous compounds

EmS-No. (1): F-A

EmS-No. (2): S-F

Air transport

UN-No.(IATA): 3077

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

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Tox. 4 (Oral)</td>
<td>H302</td>
</tr>
<tr>
<td>Eye Dam. 1</td>
<td>H318</td>
</tr>
<tr>
<td>Aquatic Acute 1</td>
<td>H400</td>
</tr>
<tr>
<td>Aquatic Chronic 1</td>
<td>H410</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Xn; R22
Xi; R41
N; R50/53

Full text of R-phrases: see section 16

National regulations

No additional information available

15.3. US State regulations

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Tox. 4 (Oral)</td>
<td>H302</td>
</tr>
<tr>
<td>Aquatic Acute 1</td>
<td>H318</td>
</tr>
<tr>
<td>Aquatic Chronic 1</td>
<td>H400</td>
</tr>
<tr>
<td>Eye Dam. 1</td>
<td>H410</td>
</tr>
</tbody>
</table>

Acute toxicity (oral) Category 4
Hazardous to the aquatic environment - Acute Hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 1
Serious eye damage/eye irritation Category 1
Harmful if swallowed
Causes serious eye damage
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

NFPA health hazard: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard: 0 - Materials that will not burn.

NFPA reactivity: 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.

SDS US (GHS HazCom 2012)

All information contained in this Safety Data Sheet is furnished free of charge and is intended for your evaluation. In our opinion the information is, as of the date of this Safety Data Sheet, reliable, however, it is your responsibility to determine the suitability of the information for your use. You are advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional or variable conditions or circumstances exist or because of applicable laws or government regulations. Therefore, you should use this information only as a supplement to other information gathered by you, and you must make independent determinations of the suitability and completeness of the information from all sources to assure both proper use of the material described herein and the safety and health of employees. Accordingly, no guarantee is expressed or implied as to the results to be obtained based upon your use of the information.