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

Product identifier
Product Name Zirconium Sponge (undistilled)

Other means of identification
Product Code SAC035
UN/ID No. 3089
Synonyms Undistilled Zirconium Sponge, Kroll Process Zirconium Metal with magnesium (Product #356)

Recommended use of the chemical and restrictions on use
Recommended Use Alloy product manufacture.
Uses advised against

Details of the supplier of the safety data sheet
Manufacturer Address ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA
Emergency telephone number Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids Category 2

Label elements

Emergency Overview

Appearance Sponge Physical state Solid Odor Odorless

Precautionary Statements - Prevention
Wear protective gloves/protective clothing/eye protection
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Ground/bond container and receiving equipment
If dust clouds can occur, use explosion-proof electrical/ ventilating/lighting/equipment
Precautionary Statements - Response
In case of fire: Use salt (NaCl) or class D dry powder for extinction

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated:
Zinc, copper, magnesium, or cadmium fumes may cause metal fume fever.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
</tr>
<tr>
<td>Zirconium</td>
</tr>
<tr>
<td>Magnesium</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First aid measures

Eye contact
In the case of particles coming in contact with eyes during processing, treat as with any foreign object.

Skin Contact
None under normal use conditions.

Inhalation
If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.

Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Most important symptoms and effects, both acute and delayed

Symptoms
None anticipated.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Isolate large fires and allow to burn out. Smother small fires with salt (NaCl) or class D dry powder fire extinguisher.

Unsuitable extinguishing media
Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material. If a fire occurs in the area, avoid water contact with the product to prevent evolution of hazardous gases.

Specific hazards arising from the chemical
Intense heat. Very fine, high surface area material resulting from processing this product may ignite spontaneously at room temperature. WARNING: Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Hazardous combustion products
Zinc, copper, magnesium, or cadmium fumes may cause metal fume fever.
Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge May be ignited by heat, sparks or flames.

Protective equipment and precautions for firefighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required.

For emergency responders Use personal protective equipment as required. Follow Emergency Response Guidebook, Guide No. 170.

Environmental precautions

Environmental precautions Collect spillage to prevent release to the environment.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Sweep or shovel material into dry containers using non-sparking tools. Avoid creating uncontrolled dust. Wash the spill location thoroughly with water - remaining magnesium chloride residue would cause the floor to become slippery.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). For long-term storage, keep sealed in argon-filled steel drums.

Incompatible materials Water. Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

8. EXPOSURE CONTROLS/PERSORAL PROTECTION

Control parameters

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td>STEL: 10 mg/m³ STEL: 10 mg/m³ Zr</td>
<td>TWA: 5 mg/m³ Zr (vacated) STEL: 10 mg/m³ (vacated) STEL: 10 mg/m³ Zr</td>
</tr>
<tr>
<td>Magnesium 7439-95-4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Appropriate engineering controls

Engineering Controls

Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment

Eye/face protection
When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

Skin and body protection
Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Wear protective gloves. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.

Respiratory protection
When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Sponge</td>
<td>Odor</td>
</tr>
<tr>
<td>Color</td>
<td>Metallic gray or silver</td>
<td>Odor threshold</td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>1850 °C / 3360 °F</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available</td>
<td>Flammable</td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor density</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>6.49</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

Other Information

| Softening point | -         |
| Molecular weight| -         |
| VOC Content (%) | Not applicable |
| Density         | -         |
| Bulk density    | -         |
Reactivity
Reacts with water

Chemical stability
Stable under normal conditions.

Possibility of Hazardous Reactions
Reacts with water.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Dust formation and dust accumulation. Unintentional contact with water. When mixed with water, heat, steam, and possibly
hydrogen and hydrogen sulfide gas may be generated. Do not mix magnesium chloride with water except in a well-ventilated area,
under conditions where heat and any gas that may evolve can easily dissipate.

Incompatible materials
Water. Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the
following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

Hazardous Decomposition Products
None while dry and cool. Magnesium chloride heated above 110°C in the presence of moisture will evolve hydrogen chloride
fumes.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation
Product not classified.

Eye contact
Product not classified.

Skin Contact
Product not classified.

Ingestion
Product not classified.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td>&gt; 5000 mg/kg bw</td>
<td>-</td>
<td>&gt;4.3 mg/L</td>
</tr>
<tr>
<td>Magnesium 7439-95-4</td>
<td>&gt;2000 mg/kg bw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
<td>5000 mg/kg bw</td>
<td>&gt;2000 mg/kg bw</td>
<td>-</td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms
None known.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity
Product not classified.

Skin corrosion/irritation
Product not classified.

Serious eye damage/eye irritation
Product not classified.

Sensitization
Product not classified.

Germ cell mutagenicity
Product not classified.

Carcinogenicity
Product not classified.

Reproductive toxicity
Product not classified.
12. ECOLOGICAL INFORMATION

Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td>The 14 d NOEC of zirconium dichloride oxide to Chlorella vulgaris was greater than 102.5 mg of Zr/L.</td>
<td>The 96 h LL50 of zirconium to Danio rerio was greater than 74.03 mg/L.</td>
<td>-</td>
<td>The 48 h EC50 of zirconium dioxide to Daphnia magna was greater than 74.03 mg of Zr/L.</td>
</tr>
<tr>
<td>Magnesium 7439-95-4</td>
<td>The 72 h EC50 of magnesium chloride hexahydrate to Desmodesmus subspicatus was greater than 12 mg of Mg/L.</td>
<td>The 96 h LC50 of magnesium chloride to Pimephales promelas was 541 mg of Mg/L.</td>
<td>The 3 h EC50 of magnesium chloride hexahydrate for activated sludge was greater than 108 mg of Mg/L.</td>
<td>The 48 h LC50 of magnesium chloride to Ceriodaphnia dubia was 225 mg of Mg/L.</td>
</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
<td>The 72 h EC50 of magnesium chloride to Desmodesmus subspicatus was greater than 100 mg of MgCl2/L.</td>
<td>The 96 h LC50 of magnesium chloride to Pimephales promelas was 2119.3 mg of MgCl2/L.</td>
<td>The 3 h EC50 of magnesium chloride for activated sludge was greater than 900 mg of MgCl2/L.</td>
<td>The 48 h LC50 of magnesium chloride hexahydrate to Daphnia magna was 548.4 mg of MgCl2/L.</td>
</tr>
</tbody>
</table>

Persistence and degradability

Bioaccumulation

Mobility

Other adverse effects

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging
Disposal should be in accordance with applicable regional, national and local laws and regulations.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>DOT</th>
<th>UN/ID No.</th>
<th>Proper shipping name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3089</td>
<td>Metal powders, flammable, n.o.s. (Zirconium Magnesium)</td>
</tr>
</tbody>
</table>
Hazard Class: 4.1
Packing Group: III
Special Provisions: IB6, T1, TP33
Emergency Response Guide Number: 170

15. REGULATORY INFORMATION

International Inventories
TSCA: Complies
DSL/NDSL: Complies
EINECS/ELINCS: Complies
ENCS: Complies
IECSC: Complies
KECL: Complies
PICCS: Complies
AICS: Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing andEvaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard: No
Chronic Health Hazard: No
Fire hazard: Yes
Sudden release of pressure hazard: No
Reactive Hazard: No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
</table>

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16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical and Chemical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Physical hazards</th>
<th>Personal protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>X</td>
</tr>
</tbody>
</table>

Chronic Hazard Star Legend
* = Chronic Health Hazard

Issue Date 28-May-2015
Revision Date 04-Sep-2019
Revision Note SDS sections updated 2, 3, 5, 6, 7, 8, 9, 10, 14, 16

Note:
The information provided in this safety data sheet 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. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Additional information available from:
Safety data sheets and labels available at ATImetals.com