Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Code          SAC035
Product Name          Zirconium Sponge (undistilled)
UN/ID no              3089
Synonyms             Undistilled Zirconium Sponge, Kroll Process Zirconium Metal with magnesium (Product #356)

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

Recommended Use       Alloy product manufacture
Uses advised against

1.3. Details of the supplier of the safety data sheet

Manufacturer          ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA

1.4. Emergency telephone number

Emergency Telephone   Chemtrec: +1-703-741-5970

Section 2: HAZARDS IDENTIFICATION

This material is classified per Regulation (EC) No 1272/2008.

2.1. Classification of the substance or mixture

Flammable solids       Category 2

2.2. Label elements

Danger
Flammable solid

Emergency Overview

Appearance Sponge
Physical state Solid
Odour Odourless

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

2.3 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.

---

### Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No</th>
<th>CAS No</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium</td>
<td>231-176-9</td>
<td>7440-67-7</td>
<td>60- &gt;99</td>
</tr>
<tr>
<td>Magnesium</td>
<td>231-104-6</td>
<td>7439-95-4</td>
<td>0-35</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>232-094-6</td>
<td>7786-30-3</td>
<td>0-5</td>
</tr>
</tbody>
</table>

---

### Section 4: FIRST AID MEASURES

#### 4.1. Description of first aid measures

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

**Skin Contact**  
None under normal use conditions.

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

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

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

**Symptoms**  
None anticipated.

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

**Note to doctors**  
Treat symptomatically.

---

### Section 5: FIREFIGHTING MEASURES

#### 5.1. Extinguishing media

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.

5.2. Special hazards arising from the substance or mixture
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 minimise combustible dust hazard.

Hazardous combustion products Zinc, copper, magnesium, or cadmium fumes may cause metal fume fever.

5.3. Advice for firefighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. 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.

6.2. Environmental precautions
Collect spillage to prevent release to the environment.

6.3. 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.

6.4. Reference to other sections
See Section 12: ECOLOGICAL INFORMATION.

Section 7: HANDLING AND STORAGE

7.1. 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 minimise combustible dust hazard.

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

7.2. 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.

7.3. Specific end use(s)

Risk Management Methods (RMM)
The information required is contained in this Safety Data Sheet.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>European Union</th>
<th>United Kingdom</th>
<th>France</th>
<th>Spain</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td></td>
<td>TWA: 5 mg/m³</td>
<td></td>
<td>STEL: 10 mg/m³</td>
<td>TWA: 1 mg/m³</td>
</tr>
<tr>
<td>Magnesium 7439-95-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Italy</th>
<th>Portugal</th>
<th>Netherlands</th>
<th>Finland</th>
<th>Denmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td></td>
<td></td>
<td>TWA: 5 mg/m³</td>
<td></td>
<td>TWA: 5 mg/m³</td>
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<tr>
<td>Magnesium 7439-95-4</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Austria</th>
<th>Switzerland</th>
<th>Poland</th>
<th>Norway</th>
<th>Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium 7440-67-7</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 5 mg/m³</td>
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<tr>
<td>Magnesium 7439-95-4</td>
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</tr>
<tr>
<td>Magnesium Chloride 7786-30-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Derived No Effect Level (DNEL) No DNELs are available for this product as a whole.

Predicted No Effect Concentration (PNEC) No PNECs are available for this product as a whole.

8.2. Exposure controls

Engineering Controls Avoid generation of uncontrolled particles.

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 contaminate concentrations. Respiratory protection must be provided in accordance with current local regulations.

Environmental exposure controls Section 6: ACCIDENTAL RELEASE MEASURES.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties
Physical state: Solid
Appearance: Sponge
Colour: metallic grey or Silver
Odour: Odourless
Odour threshold: Not applicable

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
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<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>-</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
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<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
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<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>Vapour pressure</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapour density</td>
<td>-</td>
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</tr>
<tr>
<td>Specific Gravity</td>
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</tr>
<tr>
<td>Water solubility</td>
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<tr>
<td>Solubility(ies)</td>
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<tr>
<td>Partition coefficient</td>
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<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>Oxidising properties</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

9.2. Other information
Softening point: -
Molecular weight: -
VOC Content (%): Not applicable
Density: -
Bulk density: -

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity
Reacts with water.

10.2. Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact: None.
Sensitivity to Static Discharge: May be ignited by heat, sparks or flames.

10.3. Possibility of hazardous reactions
Hazardous polymerisation
Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions
Reacts with water.

10.4. 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.
10.5. 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.

10.6. Hazardous decomposition products

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

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

| Inhalation | Product not classified. |
| Eye contact | Product not classified. |
| Skin Contact | Product not classified. |
| Ingestion | Product not classified. |

Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
--- | --- | --- | --- |
Zirconium | > 5000 mg/kg bw | - | >4.3 mg/L |
Magnesium | >2000 mg/kg bw | - | - |
Magnesium Chloride | 5000 mg/kg bw | >2000 mg/kg bw | - |

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.

Sensitisation

Product not classified.

Germ cell mutagenicity

Product not classified.

Carcinogenicity

Product not classified.

Reproductive toxicity

Product not classified.

STOT - single exposure

Product not classified.

STOT - repeated exposure

Product not classified.

Aspiration hazard

Product not classified.

Section 12: ECOLOGICAL INFORMATION

12.1. Toxicity

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</td>
<td>The 14 d NOEC of</td>
<td>The 96 h LL50 of</td>
<td>-</td>
<td>The 48 h EC50 of</td>
</tr>
</tbody>
</table>
zirconium dichloride oxide to Chlorella vulgaris was greater than 102.5 mg of Zr/L. The zirconium to Danio rerio was greater than 74.03 mg/L. zirconium dioxide to Daphnia magna was greater than 74.03 mg of Zr/L. 

**Magnesium**

<table>
<thead>
<tr>
<th></th>
<th>The 72 h EC50 of magnesium chloride hexahydrate to Desmodesmus subspicatus was greater than 12 mg of Mg/L.</th>
<th>The 96 h LC50 of magnesium chloride to Pimephales promelas was 541 mg of Mg/L.</th>
<th>The 3 h EC50 of magnesium chloride hexahydrate for activated sludge was greater than 108 mg of Mg/L.</th>
<th>The 48 h LC50 of magnesium chloride to Ceriodaphinia dubia was 225 mg of Mg/L. The 48 h LC50 of magnesium chloride hexahydrate to Daphnia magna was 322 mg of Mg/L.</th>
</tr>
</thead>
</table>

**Magnesium Chloride**

|            | The 72 h EC50 of magnesium chloride to Desmodesmus subspicatus was greater than 100 mg of MgCl2/L. | The 96 h LC50 of magnesium chloride to Pimephales promelas was 2119.3 mg of MgCl2/L. | The 3 h EC50 of magnesium chloride for activated sludge was greater than 900 mg of MgCl2/L. | The 48 h LC50 of magnesium chloride hexahydrate to Daphnia magna was 548.4 mg of MgCl2/L. |

12.2. Persistence and degradability

12.3. Bioaccumulative potential

12.4. Mobility in soil

Mobility

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria do not apply to inorganic substances.

12.6. Other adverse effects

### Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

- **Waste from residues/unused products**
  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.

### Section 14: TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>IMDG</th>
<th>14.1  UN/ID no</th>
<th>3089</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14.2  Proper shipping name</td>
<td>Metal powders, flammable, n.o.s. (Zirconium Magnesium)</td>
</tr>
<tr>
<td></td>
<td>14.3  Hazard Class</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>14.4  Packing Group</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>14.5  Marine pollutant</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>14.6  Special Provisions</td>
<td>IB6, T1, TP33</td>
</tr>
<tr>
<td></td>
<td>14.7  Transport in bulk according to Annex II of MARPOL and the IBC Code</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
SAC035 Zirconium Sponge (undistilled) Revision Date 04-Sep-2019

RID
14.1 UN/ID no 3089
14.2 Proper shipping name Metal powders, flammable, n.o.s. (Zirconium Magnesium)
14.3 Hazard Class 4.1
14.4 Packing Group III
14.5 Environmental hazard Not applicable
14.6 Special Provisions IB6, T1, TP33

ADR
14.1 UN/ID no 3089
14.2 Proper shipping name Metal powders, flammable, n.o.s. (Zirconium Magnesium)
14.3 Hazard Class 4.1
14.4 Packing Group III
14.5 Environmental hazard Not applicable
14.6 Special Provisions IB6, T1, TP33

ICAO (air)
14.1 UN/ID no 3089
14.2 Proper shipping name Metal powders, flammable, n.o.s. (Zirconium Magnesium)
14.3 Hazard Class 4.1
14.4 Packing Group III
14.5 Environmental hazard Not applicable
14.6 Special Provisions IB6, T1, TP33

IATA
14.1 UN/ID no 3089
14.2 Proper shipping name Metal powders, flammable, n.o.s. (Zirconium Magnesium)
14.3 Hazard Class 4.1
14.4 Packing Group III
14.5 Environmental hazard Not applicable
14.6 Special Provisions IB6, T1, TP33

ERG Code 170

Section 15: REGULATORY INFORMATION

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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>French RG number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7439-95-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7786-30-3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Authorisations and/or restrictions on use:
This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV). This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII).

International Inventories

<table>
<thead>
<tr>
<th>DSL/NDSL</th>
<th>Complies</th>
</tr>
</thead>
<tbody>
<tr>
<td>EINECS/ELINCS</td>
<td>Complies</td>
</tr>
<tr>
<td>ENCS</td>
<td>Complies</td>
</tr>
<tr>
<td>IECSC</td>
<td>Complies</td>
</tr>
<tr>
<td>KECL</td>
<td>Complies</td>
</tr>
<tr>
<td>PICCS</td>
<td>Complies</td>
</tr>
</tbody>
</table>
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 and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

Section 16: OTHER INFORMATION

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.

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Note:
The information provided in this Material 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.

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

End of Safety Data Sheet