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

1.1. Product identifier

Product Code SAC017
Product Name Zirconium/Magnesium: Compacts, Turnings, Chips
UN/ID no 3089
Synonyms Zirconium sponge compacts (distilled), Zirconium/ Magnesium from the Kroll Process (Product #309)

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 Address 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

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

Flammable solids Category 1

2.2. Label elements

Danger
Hazard statements Flammable solids
Appearance Chunks  Physical state Solid; Powder  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
Use explosion-proof electrical/ventilating/lighting/equipment if dust clouds can occur

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

**Synonyms**
Zirconium sponge compacts (distilled), Zirconium/ Magnesium from the Kroll Process (Product #309).

<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>55-65</td>
</tr>
<tr>
<td>Magnesium</td>
<td>231-104-6</td>
<td>7439-95-4</td>
<td>35-40</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>232-094-6</td>
<td>7786-30-3</td>
<td>1-5</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: FIRE FIGHTING MEASURES

#### 5.1. Extinguishing media

**Suitable extinguishing media**
Smother 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.

5.2. Special hazards arising from the substance or mixture
Intense heat. 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 resulting from grinding, buffing, polishing, or similar processes 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
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

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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. Avoid creating uncontrolled dust.

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 resulting from grinding, buffing, polishing, or similar processes 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 chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).
Incompatible materials
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>
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<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>
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<tr>
<td>Magnesium 7439-95-4</td>
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<tr>
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</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>STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 1 mg/m³</td>
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<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>
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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>
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<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
Wear fire/flame resistant/retardant clothing. 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
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<tr>
<td>Physical state</td>
<td>Solid, Powder</td>
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<tr>
<td>Appearance</td>
<td>Chunks</td>
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<tr>
<td>Colour</td>
<td>grey Silver</td>
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<td>Odour</td>
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<tr>
<td>Density</td>
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<tr>
<td>Bulk density</td>
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<tr>
<td>pH</td>
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<tr>
<td>Melting point/freezing point</td>
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<tr>
<td>Boiling point / boiling range</td>
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<tr>
<td>Flash point</td>
<td>-</td>
<td></td>
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<tr>
<td>Evaporation rate</td>
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<td>Lower flammability limit</td>
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<tr>
<td>Vapour pressure</td>
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<tr>
<td>Vapour density</td>
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<td>Water solubility</td>
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</tr>
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<td>Autoignition temperature</td>
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<tr>
<td>Decomposition temperature</td>
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<td>Not applicable</td>
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<tr>
<td>Kinematic viscosity</td>
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<td>Not applicable</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
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<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
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<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 100lb/ft³

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Not applicable

10.2. Chemical stability

Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

10.3. Possibility of hazardous reactions

Hazardous polymerisation
Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions
None under normal processing.

10.4. Conditions to avoid

Dust formation and dust accumulation.
10.5. Incompatible materials

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

Not applicable.

---

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

<table>
<thead>
<tr>
<th></th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium</td>
<td>&gt; 5000 mg/kg bw</td>
<td>-</td>
<td>&gt;4.3 mg/L</td>
</tr>
<tr>
<td>Magnesium</td>
<td>&gt;2000 mg/kg bw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium Chloride</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.

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 Micro-organisms</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>
### 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

**IMDG**
- **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**: II
- **14.5 Marine pollutant**: Not applicable
- **14.6 Special Provisions**: IB8, IP2, IP4, T3, TP33
- **14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: Not applicable

**RID**
- **14.1 UN/ID no**: 3089
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>7440-67-7</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium</td>
<td>7439-95-4</td>
<td>-</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>7786-30-3</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

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 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 08-Jul-2015
Revision Date 05-Dec-2016
Revision Note Updated Section(s): 1, 2, 6, 9, 12, 14.

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