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

Product identifier
Product Name Zirconium Hydride

Other means of identification
Product Code SAC050
UN/ID No. 1437
Synonyms Zirconium Hydride, Zirconium Dihydride: Product #306

Recommended use of the chemical and restrictions on use
Recommended Use Zirconium 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 chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids Category 1

Label elements

Emergency Overview

Danger

Hazard statements
Flammable solids

Appearance Powder 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
In case of fire: Use salt (NaCl) or class D dry powder for extinction

**Hazards not otherwise classified (HNOC)**
Not applicable

**Other Information**

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms**
Zirconium Hydride, Zirconium Dihydride: Product #306.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Hydride</td>
<td>7704-99-6</td>
<td>&gt; 99</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.

**Specific hazards arising from the chemical**
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 minimize combustible dust hazard.

**Hazardous combustion products**
Not applicable.

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

**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**

#### 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 up and shovel into suitable containers. Avoid creating uncontrolled dust.

### 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 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 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**
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/PERSONAL PROTECTION

#### Control parameters

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Hydride</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7704-99-6</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.

- **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</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Powder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>metallic dark grey to black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>Evolves hydrogen above 300 °C / 570 °F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>-</td>
<td>Flammable</td>
<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>-</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Vapor density</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>5.6</td>
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</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
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<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>-</td>
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</tr>
<tr>
<td>Partition coefficient</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>-</td>
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</tr>
<tr>
<td>Decomposition temperature</td>
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<td></td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>-</td>
<td>Not applicable</td>
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</tr>
<tr>
<td>Dynamic viscosity</td>
<td>-</td>
<td>Not applicable</td>
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</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softening point</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molecular weight</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulk density</td>
<td>170 lb/ft³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

#### Reactivity
Not applicable

#### Chemical stability
Stable under normal conditions.

#### Possibility of Hazardous Reactions
None under normal processing.

- **Hazardous polymerization**: Hazardous polymerization does not occur.

#### Conditions to avoid
Dust formation and dust accumulation.
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.

Hazardous Decomposition Products
Not applicable.

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 Hydride</td>
<td>&gt; 5000 mg/kg bw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7704-99-6</td>
<td></td>
<td></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.

STOT - single exposure
Product not classified.

STOT - repeated exposure
Product not classified.

Aspiration hazard
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 Hydride</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7704-99-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and degradability

Bioaccumulation

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

DOT
Regulated

UN/ID No. 1437

Proper shipping name Zirconium Hydride

Hazard Class 4.1

Packing Group II

Special Provisions A19, A20, IB4, N34, T3, TP33

Emergency Response Guide Number 138

15. REGULATORY INFORMATION

International Inventories

TSCA Complies

DSL/NDSL Complies

EINECS/ELINCS Complies

ENCS Complies

IECSC Not Listed

KECL Complies

PICCS Complies

AICS Not Listed

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

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

U.S. EPA Label Information

EPA Pesticide Registration Number: Not applicable

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>0</td>
<td>Personal protection X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1*</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Chronic Hazard Star Legend

* = Chronic Health Hazard

Issue Date: 31-May-2019
Revision Date: 05-Jun-2019
Revision Note: Updated Section(s): 1, 3, 11, 14

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