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

Product identifier
Product Name Zirconium Oxynitrate

Other means of identification
Product Code SAC037
UN/ID No. 3085
Synonyms Zirconium Oxynitrate: Zirconium Dinitrate Oxide, Zirconium Dinitrate Dihydroxide, Zirconium Nitrate Hydroxide, Zirconyl Nitrate (Product #316)

Recommended use of the chemical and restrictions on use
Recommended Use Zirconium Compounds.
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)

<table>
<thead>
<tr>
<th>Hazard Class/Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Oxidizing solids</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Label elements

Emergency Overview

Danger

Hazard statements
May intensify fire; oxidizer
Causes severe skin burns and eye damage
Causes serious eye damage
Harmful if swallowed
Appearance Powder  Physical state Solid  Odor Pungent, Slight nitric acid

Precautionary Statements - Prevention
Wear protective gloves/protective clothing/eye protection
Do not breathe dust/gas/mist
Do not eat, drink or smoke when using this product
Wash hands thoroughly after handling
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Store away from flammable substances, reducing agents, metal powders, and organic materials.

Precautionary Statements - Response
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician
IF ON SKIN (or hair): Brush off loose particles from skin, Remove/Take off immediately all contaminated clothing, Rinse skin with water/shower
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Wash contaminated clothing before reuse
In case of fire: Use Water spray, fog or regular foam for extinction

Precautionary Statements - Storage
Store in a dry place. Store in corrosion-resistant container.

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable

Other Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Zirconium Oxynitrate; Zirconium Dinitrate Oxide, Zirconium Dinitrate Dihydroxide, Zirconium Nitrate Hydroxide, Zirconyl Nitrate (Product #316).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Dinitrate Oxide</td>
<td>13826-66-9</td>
<td>&gt;99</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First aid measures

Eye contact Flush with water for 15 minutes. See a physician.

Skin Contact Brush off loose particles from skin. Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

Inhalation IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician or poison control center immediately.

Ingestion Do NOT induce vomiting. Have patient drink large quantities of water if able. Call Physician immediately for further instructions.

Most important symptoms and effects, both acute and delayed

Symptoms May cause acute gastrointestinal effects if swallowed. Contact with moist skin may cause skin burns. May cause breathing difficulties if inhaled.

Indication of any immediate medical attention and special treatment needed

Page 2 / 8
5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Material is a strong oxidizer but is itself not flammable. Water spray or fog is preferred; if water not available use dry chemical, CO2 or regular foam.

Unsuitable extinguishing media None.

Specific hazards arising from the chemical
This is a strong oxidizer and will react vigorously or explosively with many materials including organic materials, such as wood and paper, and flammable metals.

Hazardous combustion products Nitrogen oxide gases may cause respiratory and/or eye irritation.

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 Use personal protective equipment as required. Follow Emergency Response Guidebook, Guide No. 140.

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. Avoid creating uncontrolled dust. Wash the spill location thoroughly with water. Respiratory protection may be needed. Skin and eye protection should be used during cleanup.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Protect from moisture: Reacts with water. Ensure adequate ventilation, especially in confined areas. Handle under inert gas such as nitrogen or argon to maintain the integrity of the product.

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). Store away from flammable substances, reducing agents, metal powders, and organic materials. Keep in properly labeled containers. Keep in a dry, cool and well-ventilated place. Protect from direct sunlight. Containers may become pressurized. Handle and open container with care.

Incompatible materials Water, alcohols, phenols, and amines. Rubber, coatings, and some plastics. Flammable
substances, reducing agents, metal powders, and organic materials. Reacts with metals to produce heat and corrosive gases.

### 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 Dinitrate Oxide</td>
<td>STEL: 10 mg/m³ Zr</td>
<td>TWA: 5 mg/m³ Zr</td>
</tr>
<tr>
<td>13826-66-9</td>
<td></td>
<td>(vacated) STEL: 10 mg/m³ Zr</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**

**Engineering Controls**
Avoid generation of uncontrolled particles. Local exhaust ventilation during processing is recommended.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**
If a risk of eye injury or irritation is present, appropriate eye protection is recommended; for example, tight-fitting goggles, foam-lined safety glasses, face shield, or other protective equipment that shields the eyes.

**Skin and body protection**
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**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**

- **Physical state**: Solid
- **Appearance**: Powder
- **Color**: white
- **Odor**: Pungent, Slight nitric
- **Odor threshold**: -

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>-</td>
<td>Not 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>1.7</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>Soluble in water</td>
<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>-</td>
<td></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>
</tbody>
</table>
Oxidizing properties
Strong oxidizer and will react vigorously or explosively with many materials including organic materials, such as wood and paper, and flammable metals.

Other Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softening point</td>
<td>-</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>-</td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Density</td>
<td>-</td>
</tr>
<tr>
<td>Bulk density</td>
<td>48 lb/ft³</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity
Reacts with water. Strong oxidizer and will react vigorously or explosively with many materials including organic materials, such as wood and paper, and flammable metals.

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
Reacts with water.

Hazards polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Unintentional contact with water. Heat. Electrostatic discharge.

Incompatible materials

Hazardous Decomposition Products
Reacts with water to produce nitric acid and heat.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

<table>
<thead>
<tr>
<th>Route</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Product not classified.</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Causes severe eye damage.</td>
</tr>
<tr>
<td>Skin Contact</td>
<td>Causes severe skin burns.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Harmful if swallowed.</td>
</tr>
</tbody>
</table>

<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 Dinitrato Oxide</td>
<td>&gt; 300 and &lt; 2000 mg/kg bw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13826-66-9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms
May cause skin burns. May cause burning sensation or redness in the eyes. May cause acute gastrointestinal effects if swallowed. May cause severe upper respiratory irritation if inhaled.
Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity
- Harmful if swallowed.

Skin corrosion/irritation
- Causes severe skin burns.

Serious eye damage/eye irritation
- Causes severe eye damage.

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.

Target Organ Effects
- .

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 Dinitrate Oxide 13826-66-9</td>
<td>The 72 h EC50 of zirconium dichloride oxide to Pseudokirchnerella subcapitata was 80% v/v saturated solution.</td>
<td>The 96 h LL50 of zirconium dinitrate oxide to Oncorhynchus mykiss was greater than 100 mg/L.</td>
<td>-</td>
<td>The 48 h EC50 of zirconium dioxide to Daphnia magna was greater than 100 mg/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.

14. TRANSPORT INFORMATION

DOT
Regulated
UN/ID No.
3085
Proper shipping name: Oxidizing Solid, Corrosive, n.o.s. (Zirconium Oxynitrate)
Hazard Class: 5.1
Subsidiary class: 8
Packing Group: II
Special Provisions: 62, IB8, IP3, T1, TP33
Emergency Response Guide Number: 140

15. REGULATORY INFORMATION

International Inventories
- TSCA: Complies
- DSL/NDSL: Complies
- EINECS/ELINCS: Complies
- ENCS: Complies
- IECSC: Complies
- KECL: Complies
- PICCS: Not Listed
- 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: Yes
- Chronic Health Hazard: No
- Fire hazard: No
- Sudden release of pressure hazard: No
- Reactive Hazard: Yes

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
### Chemical Name

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Dinitrate Oxide</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13826-66-9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### U.S. EPA Label Information

**EPA Pesticide Registration Number** Not applicable

## 16. OTHER INFORMATION

### NFPA

- **Health hazards**: 1
- **Flammability**: 1
- **Instability**: 1

### HMIS

- **Health hazards**: 2
- **Flammability**: 2
- **Physical hazards**: 1
- **Personal protection**: X

**Chronic Hazard Star Legend**

* = Chronic Health Hazard

**Issue Date**: 25-Jan-2017
**Revision Date**: 20-Mar-2018
**Revision Note**: Updated Section(s): 1, 2, 5, 6, 7, 8, 9, 11, 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