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

Product identifier
Product Name Zirconium Oxynitrate Solution

Other means of identification
Product Code SAC029
UN/ID No. 3098
Synonyms Zirconium Oxynitrate Solution: Zirconium Nitrate Oxide Solution, Zirconium Dinitrate Oxide Solution (Product #326)

Recommended use of the chemical and restrictions on use
Recommended Use Chemical intermediate.
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 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin corrosion/iritation</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Oxidizing liquids</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Label elements

Emergency Overview

Danger

Hazard statements
Causes severe skin burns and eye damage
Causes serious eye damage
Harmful if swallowed
May intensify fire; oxidizer

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

Precautionary Statements - Response
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician. IF ON SKIN (or hair): Rinse cautiously with water for several minutes. 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 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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>60</td>
</tr>
<tr>
<td>Zirconium Dinitrate Oxide</td>
<td>13826-66-9</td>
<td>40</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First aid measures

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

Skin Contact
Wash off immediately with soap and plenty of water. 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 skin may cause skin burns. May cause breathing difficulties if inhaled.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

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 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. Ensure adequate ventilation, especially in confined areas. 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. Keep 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). 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. Keep in corrosion resistant containers. Store away from flammable substances, reducing agents, metal powders, and organic materials.

Incompatible materials Alcohols, phenols, and amines. Rubber, coatings, and some plastics.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
### Appropriate engineering controls

**Engineering Controls**
Avoid generation of uncontrolled mist.

**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 gases/mists/vapors 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>Liquid</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Liquid</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>white, light brown</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent; Slight nitric</td>
<td></td>
</tr>
<tr>
<td>Odor threshold</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>-15 °C / 5 °F</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>104 °C / 220 °F</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>-</td>
<td></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>1.45</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>Not applicable</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></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>Strong oxidizer and will react vigorously or explosively with many materials including organic materials, such as wood and paper, and flammable metals.</td>
<td></td>
</tr>
</tbody>
</table>

**Other Information**

- Softening point: -
- Molecular weight: -
10. STABILITY AND REACTIVITY

Reactivity
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
None under normal processing.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
To avoid thermal decomposition, do not overheat.

Incompatible materials
Alcohols, phenols, and amines. Rubber, coatings, and some plastics.

Hazardous Decomposition Products
Nitrogen oxide gases may cause respiratory and/or eye irritation. Thermal decomposition produces nitrogen oxide gas.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation
Product not classified.

Eye contact
Causes severe eye damage.

Skin Contact
Causes severe skin burns.

Ingestion
Harmful if swallowed.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7732-18-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zirconium Dinitrate 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 acute gastrointestinal effects if swallowed. May cause skin burns. May cause severe upper respiratory irritation if inhaled. May cause burning sensation or redness in the eyes.

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.
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>Water 7732-18-5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Zirconium Dinitrate Oxide</td>
<td>The 72 h EC50 of zirconium dichloride oxide to <em>Pseudokirchnerella subcapitata</em> was 80% v/v saturated solution.</td>
<td>The 96 h LL50 of zirconium dinitrate oxide to <em>Oncorhynchus mykiss</em> was greater than 100 mg/L.</td>
<td>-</td>
<td>The 48 h EC50 of zirconium dioxide to <em>Daphnia magna</em> was greater than 100 mg/L.</td>
</tr>
<tr>
<td>13826-66-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UN/ID No.</th>
<th>Proper shipping name</th>
<th>Hazard Class</th>
<th>Packing Group</th>
<th>Special Provisions</th>
<th>Emergency Response Guide Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3098</td>
<td>Oxidizing liquid, Corrosive, n.o.s. (Zirconium Oxynitrate)</td>
<td>5.1(8)</td>
<td>II</td>
<td>62, IB1</td>
<td>140</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>TSCA</th>
<th>DSL/NDSL</th>
<th>EINECS/ELINCS</th>
<th>ENCS</th>
<th>IECSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
</tr>
</tbody>
</table>
SAC029 Zirconium Oxynitrate Solution

Revision Date 17-Dec-2019

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

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute health hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Fire hazard</td>
<td>No</td>
</tr>
<tr>
<td>Sudden release of pressure hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Water 7732-18-5</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Zirconium Dinitrate Oxide 13826-66-9</td>
<td>X</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 0 Physical and Chemical Properties -

HMIS
Health hazards 2 Flammability 2 Physical hazards 0 Personal protection X

Chronic Hazard Star Legend * = Chronic Health Hazard

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North America; English
Issue Date 14-Apr-2017
Revision Date 17-Dec-2019
Revision Note
Updated to comply with GHS

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.

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

End of Safety Data Sheet