Safety Data Sheet
In accordance with CFR 1910.1200 (OSHA HCS)

SDS No. 3030 Review Date: February 22, 2019

1 Identification of substance and company

Product name: Zirconium oxynitrate, hydrate
Product code: 11389, 14647, 19943, C2807, C2809, C2359
Relevant use and restrictions on use: Research and product development
Manufacturer/Supplier: Noah Technologies Corporation
1 Noah Park
San Antonio, Texas 78249-3419
Phone: 210-691-2000
Fax: 210-691-2600
Web site: www.noahtech.com

Emergency information:
CHEMTREC
800-424-9300

2 Hazards identification

Emergency Overview:

Pictogram(s):

Signal word(s): Danger

Hazard statements:
H272 - May intensify fire; oxidizer
H314 - Causes severe skin burns and eye damage.

Precautionary statements:
P210 - Keep away from heat.
P220 - Keep / Store away from clothing / combustible materials.
P221 - Take any precaution to avoid mixing with combustibles
P260 - Do not breathe dust or mist
P264 - Wash skin thoroughly after handling
P280 - Wear protective gloves / protective clothing / eye protection / face protection
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P338 - IF ON SKIN (hair): Remove / Take off immediately all contaminated clothing.
Rinse skin with water / shower.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor / physician.
P363 - Wash contaminated clothing before reuse
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant

GHS Classification:
Oxidizing solids - 2
Skin corrosion - 1B
Serious eye damage - 1

Hazards not otherwise classified:
None

HMIS ratings (scale 0-4):
Health hazard: 3
Flammability: 0
Physical hazard: 2

3 Composition/Information on ingredients

Chemical name: Zirconium oxynitrate, hydrate
CAS number: 14985-18-3
EC number: 237-529-3
4 First aid measures

After inhalation: Move victim to fresh air. If not breathing, give artificial respiration. Consult a physician.
After skin contact: Flush with soap and water. Consult a physician.
After eye contact: Flush with plenty of water for at least 15 minutes. Get a physician. Continue rinsing eyes during transport to hospital.
After ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Information for doctor: Show this safety data sheet to the doctor in attendance
Symptoms/effects; acute and delayed: Irritation of the respiratory tract with burning, choking and coughing. Skin irritation and burns may occur.
Immediate medical attention and special treatment needed: No data available

5 Fire-fighting measures

Suitable and unsuitable extinguishing agents: Water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing media most suitable to surrounding fire conditions.
Special hazards caused by the material, its products of combustion or resulting gases: Nitric acid. Oxides of zirconium and nitrogen (NOx)
Special fire fighting procedures: Wear self-contained breathing apparatus. Always wear full fire fighting equipment / clothing in fire situations.
Unusual fire and explosion hazard: This substance is an oxidizer and it's heat of reaction with reducing agents or combustibles may cause ignition

6 Accidental release measures

Person-related safety precautions: Use personal protective equipment. Avoid breathing dust, vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe area.
Measures for environmental protection: Do not let product enter drains.
Measures for cleaning/collection: Sweep or scoop up and remove. Place in a suitable container for proper disposal. Neutralize material with limestone, soda ash, lime. Ventilate and wash spill site after removal is complete.
Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protective equipment
See Section 13 for information on disposal
See Section 15 for regulatory information

7 Handling and storage

Information for safe handling: Avoid formation of dust and aerosols. Ensure adequate ventilation. Keep away from heat, sparks and open flames.
Information about protection against explosions and fires: Substance is an oxidizer and it’s heat of reaction with reducing agents or combustibles may cause ignition.
Storage requirements to be met by storerooms and containers: Keep in tightly closed containers. Do not store near combustibles. Store in cool, dry place.
Further information about storage conditions: Heating above 60 C causes decomposition, releasing water vapor and toxic fumes of oxides nitrogen

8 Exposure controls/personal protection

Ventilation requirements: Use with adequate ventilation.
Chemical fume hood.
Components with exposure limits that require monitoring: OSHA PEL: TWA 5 mg (Zr) / m3
ACGIH TLV: 5 mg (Zr) / m3
General protective and hygienic measures: The usual precautionary measures for handling chemicals should be adhered to
Instantly remove any soiled and impregnated garments
Wash hands during breaks and at the end of the work
Avoid contact with the eyes and skin
Personal protective equipment:
Respiratory protection: Filter-dust, fume, mist
(Use only NIOSH or CEN approved Equipment)
Hand protection: Handle with gloves: Neoprene / Impervious
Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with product.
Eye protection: Face shield and safety glasses
Skin protection: Protective work clothing sufficient to prevent contact. Use protective clothing resistant to Nitric Acid.
### Additional protective equipment:
Emergency eyewash and safety shower.

### Precautionary labeling:
- Do not get in eyes, on skin or on clothing
- Keep container closed.
- Keep away from heat, sparks and open flames.
- Do not store near combustibles.
- Empty container may contain hazardous residues.

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### 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical state:</strong></td>
<td>Powder or pieces</td>
</tr>
<tr>
<td><strong>Color:</strong></td>
<td>White to yellow</td>
</tr>
<tr>
<td><strong>Odor:</strong></td>
<td>Odor of nitric acid</td>
</tr>
<tr>
<td><strong>Odor threshold:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Molecular Weight (Calculated):</strong></td>
<td>231.22 anhyd</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Melting point/freezing point/range:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Boiling point/range:</strong></td>
<td>Decomposes</td>
</tr>
<tr>
<td><strong>Sublimation temperature/start:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Decomposition temperature:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas):</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flash point:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Autoignition temperature:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Danger of explosion:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammable limits:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lower:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Upper:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Evaporation Rate:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor pressure (mm Hg):</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor density:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Specific gravity:</strong></td>
<td>~1.7 g/cm³</td>
</tr>
<tr>
<td><strong>Bulk density:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Solubility in/Miscibility with water:</strong></td>
<td>950 g/L @ 20 C</td>
</tr>
<tr>
<td><strong>Partition coefficient n-octanol/water:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Other information:</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>

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### 10 Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reactivity:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Chemical stability:</strong></td>
<td>Stable under recommended storage conditions.</td>
</tr>
<tr>
<td><strong>Possibility of hazardous reactions:</strong></td>
<td>Heating above 60 C causes decomposition, releasing water vapor and toxic fumes of oxides of nitrogen.</td>
</tr>
<tr>
<td><strong>Conditions to be avoided:</strong></td>
<td>Heat. Open flames. Sparks. Ignition sources.</td>
</tr>
<tr>
<td><strong>Materials to be avoided:</strong></td>
<td>Strong acids. Strong reducing agents. Combustible materials. Flammable substances.</td>
</tr>
<tr>
<td><strong>Dangerous reactions:</strong></td>
<td>Substance is an oxidizer and it's heat of reaction with reducing agents or combustibles may cause ignition.</td>
</tr>
<tr>
<td><strong>Hazardous decomposition products:</strong></td>
<td>Nitric acid. Oxides of zirconium and nitrogen (NOx)</td>
</tr>
</tbody>
</table>

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### 11 Toxicological information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LD/LC50 values that are relevant for classification:</strong></td>
<td>inhalation-rat LC₅₀: 500 mg/m³</td>
</tr>
<tr>
<td></td>
<td>oral-rat LD₅₀: 2500 mg/kg (anhydrous)</td>
</tr>
<tr>
<td><strong>Irritation or corrosion of skin:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Irritation or corrosion of eyes:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Primary irritant or corrosive effect:</strong></td>
<td></td>
</tr>
<tr>
<td>on the skin:</td>
<td>Moderate</td>
</tr>
<tr>
<td>on the eye:</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Sensitization:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Potential health effects:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Inhalation:</strong></td>
<td>Irritating to the mucous membranes and respiratory tract.</td>
</tr>
<tr>
<td><strong>Ingestion:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Skin:</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Eyes:</strong></td>
<td>May cause blindness.</td>
</tr>
<tr>
<td><strong>Signs and symptoms of exposure:</strong></td>
<td>Toxicity of the compound is primarily due to its acidic behavior and release of toxic fumes when heated. Acute effects are irritation of the respiratory tract with burning, choking and coughing. Skin irritation and burns may occur. Eye irritation, burns, prolonged visual impairment, including blindness, depending on degree of exposure. Small doses of nitrates may cause weakness, general depression, headache and mental impairment. Larger doses may cause dizziness, abdominal cramps, vomiting,</td>
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</tbody>
</table>

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bloody diarrhea, convulsions and collapse. Pulmonary granulomas have been observed from exposure to acidic zirconium compounds in deodorant aerosols.

Carcinogenicity:
IARC: Group 2A - probably carcinogenic to humans
ACGIH: No component of this product is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product is identified as a carcinogen or potential carcinogen by OSHA.

Additional information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecotoxicological information

Toxicity:
Toxicity to fish:
No data available
Toxicity to daphnia and other aquatic invertebrates:
No data available
Toxicity to algae:
No data available
Persistence and degradability:
No data available
Biodegradability:
No data available
Bioaccumulative potential:
No data available
Bioaccumulation:
No data available
Mobility in soil:
No data available
Other adverse effects:
No data available

13 Disposal considerations

Recommendation:
Consult state, local or national regulation for proper disposal
Allow professional disposal company to handle waste
Must be specially treated under adherence to official regulations

Unclean packagings recommendation:
Disposal must be made according to official regulations

14 Transport information

Land transport DOT

Proper shipping name: Oxidizing solid, corrosive, n.o.s.
Technical name: Zirconium oxynitrate, hydrate
DOT Hazard Class: 5.1
Subsidiary risk: 8
UN Identification number: UN3085
Label(s): Oxidizer and Corrosive
Packing group: II
Reportable quantity (RQ): 2270 kg
North American Emergency Response Guidebook No.: 141

Air transport ICAO-TI and IATA-DGR:

Proper shipping name: Oxidizing solid, corrosive, n.o.s.
Technical name: Zirconium oxynitrate, hydrate
DOT Hazard Class: 5.1
Subsidiary risk: 8
UN Identification number: UN3085
Label(s): Oxidizer and Corrosive
Packing group: II
Reportable quantity (RQ): 2270 kg
North American Emergency Response Guidebook No.: 141

UPS Ground / FedEx Ground
Proper shipping name: Oxidizing solid, corrosive, n.o.s.
Technical name: Zirconium oxynitrate, hydrate
DOT Hazard Class: 5.1
Subsidiary risk: 8
UN Identification number: UN3085
Label(s): Oxidizer and Corrosive
Packing group: II
Reportable quantity (RQ): 2270 kg
North American Emergency Response Guidebook No.: 141

UPS Air FORBIDDEN

15 Regulatory information

SARA Section 302 Extremely Hazardous components and corresponding TPOs: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302
SARA Section 311 / 312 hazards: Reactivity Hazard; Acute Health Hazard
SARA Section 313 components: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313
California Proposition 65 components: This product does not contain any chemicals known to the State of California to cause birth defects or any other reproductive harm.
TSCA: Product is listed on the TSCA Inventory

16 Other information

The above information is accurate to the best of our knowledge. However, since data, safety standards and government regulation are subject to change and the conditions of handling and use, or misuse are beyond our control. NOAH MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.