1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Zirconium
Product Number : 403296
Brand : Aldrich
Supplier : Sigma-Aldrich

3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable solid, Target Organ Effect, Carcinogen

Target Organs
Nerves., Lungs

GHS Classification
Self-heating substances (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H251 Self-heating: may catch fire.

Precautionary statement(s)
P235 + P410 Keep cool. Protect from sunlight.

HMIS Classification
Health hazard: 1
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 3

NFPA Rating
Health hazard: 1
Fire: 3
Reactivity Hazard: 3

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin
May be harmful if absorbed through skin. May cause skin irritation.

Eyes
May cause eye irritation.

Ingestion
May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zirconium Pyrophoric</strong></td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>7440-67-7</td>
</tr>
<tr>
<td>EC-No.</td>
<td>231-176-9</td>
</tr>
<tr>
<td>Index-No.</td>
<td>040-001-00-3</td>
</tr>
<tr>
<td><strong>Pentanol</strong></td>
<td>1 - 5 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>30899-19-5</td>
</tr>
<tr>
<td>EC-No.</td>
<td>250-378-8</td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-006-00-7</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**General advice**
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Flush eyes with water as a precaution.

**If swallowed**
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

**Conditions of flammability**
Flammable in the presence of a source of ignition, through friction or retained heat. Keep away from heat/sparks/open flame/hot surface. No smoking.

**Suitable extinguishing media**
D-powder Dry sand

**Special protective equipment for firefighters**
Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Zirconium oxides

**Further information**
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Handle and store under inert gas. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
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<tr>
<td>Zirconium Pyrophoric</td>
<td>7440-67-7</td>
<td>TWA</td>
<td>0.15 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>5 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td>STEL</td>
<td>10 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
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<td>TWA</td>
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<td>USA. NIOSH Recommended Exposure Limits</td>
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<tr>
<td></td>
<td></td>
<td>ST</td>
<td>10 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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</table>
Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form  powder
Colour  no data available

Safety data
pH  no data available
Melting point/freezing point  Melting point/range: 1,852 °C (3,366 °F) - lit.
Boiling point  4,377 °C (7,911 °F) - lit.
Flash point  not applicable
Ignition temperature  no data available
Auto-ignition temperature  The substance or mixture is classified as self heating with the category 1.
Lower explosion limit  no data available
Upper explosion limit  no data available
Vapour pressure  no data available
Density  6.5 g/mL at 25 °C (77 °F)
Water solubility  no data available
Partition coefficient: n-octanol/water  no data available
Relative vapour density  no data available
Odour  no data available
Odour Threshold  no data available
Evaporation rate  no data available

10. STABILITY AND REACTIVITY
**Chemical stability**  
Stable under recommended storage conditions.

**Possibility of hazardous reactions**  
no data available

**Conditions to avoid**  
no data available

**Materials to avoid**  
Water, Strong acids, Strong oxidizing agents, Hydrogen fluoride, Phosphorus, Oxygen

**Hazardous decomposition products**  
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Zirconium oxides  
Other decomposition products - no data available

Contains the following stabiliser(s):  
Pentanol (1 %)  
Water (10 %)

### 11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

- **Oral LD50**  
  no data available

- **Inhalation LC50**  
  no data available

- **Dermal LD50**  
  no data available

- **Other information on acute toxicity**  
  no data available

**Skin corrosion/irritation**  
no data available

**Serious eye damage/eye irritation**  
no data available

**Respiratory or skin sensitisation**  
no data available

**Germ cell mutagenicity**  
no data available

**Carcinogenicity**  
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

**IARC:**  
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**NTP:**  
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**OSHA:**  
1910.1029 (Zirconium Pyrophoric)

**Reproductive toxicity**
no data available

Teratogenicity

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**
no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**
no data available

**Aspiration hazard**
no data available

**Potential health effects**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>May be harmful if inhaled. May cause respiratory tract irritation.</td>
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<td>Ingestion</td>
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<td>Skin</td>
<td>May be harmful if absorbed through skin. May cause skin irritation.</td>
</tr>
<tr>
<td>Eyes</td>
<td>May cause eye irritation.</td>
</tr>
</tbody>
</table>

**Signs and Symptoms of Exposure**
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**Synergistic effects**
no data available

**Additional Information**
RTECS: ZH7070000

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**12. ECOLOGICAL INFORMATION**

**Toxicity**
no data available

**Persistence and degradability**
no data available

**Bioaccumulative potential**
no data available

**Mobility in soil**
no data available

**PBT and vPvB assessment**
no data available

**Other adverse effects**
no data available

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**13. DISPOSAL CONSIDERATIONS**

**Product**
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging**
Dispose of as unused product.

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**14. TRANSPORT INFORMATION**

**DOT (US)**
UN number: 1358  Class: 4.1  Packing group: II  Proper shipping name: Zirconium powder, wetted
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1358   Class: 4.1   Packing group: II   EMS-No: F-G, S-J
Proper shipping name: ZIRCONIUM POWDER, WETTED
Marine pollutant: No

IATA
UN number: 1358   Class: 4.1   Packing group: II
Proper shipping name: Zirconium powder, wetted

15. REGULATORY INFORMATION

OSHA Hazards
Flammable solid, Target Organ Effect, Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tr>
<td>Zirconium Pyrophoric</td>
<td>7440-67-7</td>
<td>1991-07-01</td>
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Pennsylvania Right To Know Components

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<th>Component</th>
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<tr>
<td>Water</td>
<td>7732-18-5</td>
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New Jersey Right To Know Components

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<th>CAS-No.</th>
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<tbody>
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<td>Water</td>
<td>7732-18-5</td>
<td>1991-07-01</td>
</tr>
<tr>
<td>Pentanol</td>
<td>30899-19-5</td>
<td>1991-07-01</td>
</tr>
<tr>
<td>Zirconium Pyrophoric</td>
<td>7440-67-7</td>
<td>1991-07-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.