Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • Yttria Zirconia Ceramic Ingot
Synonyms • Yttrium zirconium oxide

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s) • Use for electron beam physical vapor deposition coatings.

1.3 Details of the supplier of the safety data sheet

Manufacturer • Phoenix Coating Resources, a wholly owned subsidiary of Saint-Gobain
1 New Bond Street
Worcester, MA 01615
United States
www.coatingsolutions.saint-gobain.com
cermatworcester@saint-gobain.com

Telephone (General) • 1-800-243-0028

1.4 Emergency telephone number

Manufacturer • (800) 424-9300 - CHEMTREC

Section 2: Hazards Identification

EU/EEC

According to: EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP • Not classified
DSD/DPD • Not classified

2.2 Label Elements

CLP

Hazard statements • No label element(s) required

DSD/DPD

Risk phrases • No label element(s) required

2.3 Other Hazards

CLP • According to Regulation (EC) No. 1272/2008 (CLP) this material is not considered hazardous.

DSD/DPD • This product is not considered dangerous under the European Directive 67/548/EEC
According to: OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture
OSHA HCS 2012  •  Not classified

2.2 Label elements
OSHA HCS 2012
Hazard statements  •  No label element(s) required

2.3 Other hazards
OSHA HCS 2012  •  This product is not considered hazardous under the U.S. OSHA 29 CFR 1910.1200 Hazard Communication Standard.

Section 3 - Composition/Information on Ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>%</th>
<th>LD50/LC50</th>
<th>Classifications According to Regulation/Directive</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yttrium Zirconium Oxide</td>
<td>CAS:64417-98-7</td>
<td>100%</td>
<td>NDA</td>
<td>EU DSD/DPD: Not Classified</td>
<td>NDA</td>
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<tr>
<td></td>
<td>EINECS:264-885-7</td>
<td></td>
<td></td>
<td>EU CLP: Not Classified</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OSHA HCS 2012: Not Classified</td>
<td></td>
</tr>
</tbody>
</table>

3.2 Mixtures

• Material does not meet the criteria of a mixture.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation  •  Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If irritation develops and persists, seek medical attention.

Skin  •  In case of contact with substance, immediately flush skin with running water for at least 20 minutes. If irritation develops and persists, get medical attention.

Eye  •  In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.

Ingestion  •  Do NOT induce vomiting. Rinse mouth. Do not give anything by mouth to an unconscious person. If signs/symptoms develop, get medical attention.

4.2 Most important symptoms and effects, both acute and delayed

• Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician  •  All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.
Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media
- No data available.

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- None known.

Hazardous Combustion Products
- No data available

5.3 Advice for firefighters
- Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.
- Fire fighters should avoid inhaling any combustion products.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Material is a solid ceramic part and has no known health hazard unless dust is generated. If dust is generated during spill or clean up, wear appropriate Personal Protective Equipment (PPE).

Emergency Procedures
- No special emergency procedures are expected to be necessary in the event of a spill.

6.2 Environmental precautions
- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures
- Pick up pieces and place in container or bag for disposal.
- Sweep or vacuum any dust or particulates generated.

6.4 Reference to other sections
- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling
- Material is a solid ceramic part and has no known health hazard unless dust is generated by sawing, dicing, sanding or grinding. Keep solid material dry. Avoid contact with water. Wet material may explode violently if exposed to molten metal. Use safety glasses and approved dust mask when generating dust.

7.2 Conditions for safe storage, including any incompatibilities

Storage
- Store in a dry place.

7.3 Specific end use(s)
- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters
8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

Personal Protective Equipment

Respiratory

- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Physical Form</th>
<th>Appearance/Description</th>
<th>Boiling Point</th>
<th>Decomposition Temperature</th>
<th>Specific Gravity/Relative Density</th>
<th>Water Solubility</th>
<th>Explosive Properties</th>
<th>Volatility</th>
<th>Flammability</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Form</strong></td>
<td>Solid</td>
<td>White/off-white solid ceramic ingot</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
<td>Data lacking</td>
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<tr>
<td><strong>Color</strong></td>
<td>White/off-white</td>
<td>Odor</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Odor Threshold</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Boiling Point</strong></td>
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<td>Melting Point/Freezing Point</td>
<td>2600 °C(4712 °F)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Decomposition Temperature</strong></td>
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<td>pH</td>
<td>Data lacking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specific Gravity/Relative Density</strong></td>
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<td>Density</td>
<td>3600 to 4000 kg/m³</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Water Solubility</strong></td>
<td>Negligible &lt; 0.1 %</td>
<td>Viscosity</td>
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<td></td>
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<tr>
<td><strong>Explosive Properties</strong></td>
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<td>Oxidizing Properties:</td>
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<td></td>
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<tr>
<td><strong>Vapor Pressure</strong></td>
<td>Data lacking</td>
<td>Vapor Density</td>
<td>Data lacking</td>
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<td></td>
<td></td>
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<td><strong>Evaporation Rate</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Flash Point</strong></td>
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<td>UEL</td>
<td>Data lacking</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td><strong>LEL</strong></td>
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<td>Autoignition</td>
<td>Data lacking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>Data lacking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Octanol/Water Partition coefficient</strong></td>
<td>Data lacking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity
10.2 Chemical stability
   - Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions
   - Hazardous polymerization not indicated.

10.4 Conditions to avoid
   - None known.

10.5 Incompatible materials
   - None known.

10.6 Hazardous decomposition products
   - None known.

**Section 11 - Toxicological Information**

### 11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>GHS Properties</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>EU/CLP • Acute Toxicity - Dermal - Data lacking; Acute Toxicity - Inhalation -</td>
</tr>
<tr>
<td></td>
<td>Classification criteria not met; Acute Toxicity - Oral - Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Acute Toxicity - Dermal - Data lacking; Acute Toxicity - Inhalation -</td>
</tr>
<tr>
<td></td>
<td>Classification criteria not met; Acute Toxicity - Oral - Classification criteria not met</td>
</tr>
<tr>
<td>Skin corrosion/Irritation</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>Serious eye damage/Irritation</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>Respiratory sensitization</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td>Aspiration Hazard</td>
<td>EU/CLP • Not relevant</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Not relevant</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>Toxicity for Reproduction</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>STOT-SE</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
<tr>
<td>STOT-RE</td>
<td>EU/CLP • Classification criteria not met</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
</tr>
</tbody>
</table>

**Potential Health Effects**

**Inhalation**

**Acute (Immediate)**
- Exposure to dust may cause irritation. Processes such as cutting, grinding, crushing,
or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

**Skin**

**Acute (Immediate)**
- Exposure to dust may cause mechanical irritation.

**Chronic (Delayed)**
- No data available.

**Eye**

**Acute (Immediate)**
- Exposure to dust may cause mechanical irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

**Chronic (Delayed)**
- No data available.

**Ingestion**

**Acute (Immediate)**
- Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.

**Chronic (Delayed)**
- No data available.

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**Section 12 - Ecological Information**

**12.1 Toxicity**
- Material data lacking.

**12.2 Persistence and degradability**
- Material data lacking.

**12.3 Bioaccumulative potential**
- Material data lacking.

**12.4 Mobility in Soil**
- Material data lacking.

**12.5 Results of PBT and vPvB assessment**
- No PBT and vPvB assessment has been conducted.

**12.6 Other adverse effects**
- No studies have been found.

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**Section 13 - Disposal Considerations**

**13.1 Waste treatment methods**

**Product waste**
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Packaging waste**
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

---

**Section 14 - Transport Information**

<table>
<thead>
<tr>
<th></th>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
</tbody>
</table>
14.6 Special precautions for user
- None specified.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
- Data lacking.

### Section 15 - Regulatory Information

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**SARA Hazard Classifications**
- None

**Germany**

**Labor**
- Germany - Immission Control - Qualifying Quantities for Major Accident Prevention
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - Immission Control - Qualifying Quantities for Safety Reporting
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TRGS 505 - Specific Lead Regulations
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TRGS 511 - Specific Ammonium Nitrate Regulations
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed

**Environment**
- Germany - TA Luft - Types and Classes
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TA Luft - Emission Limits for Carcinogenic Substances
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TA Luft - Emission Limits for Fibers
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TA Luft - Emission Limits for Inorganic Dusts
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TA Luft - Emission Limits for Inorganic Gases
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - TA Luft - Emission Limits for Organic Substances
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - Water Classification (VwVwS) - Annex 1
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
- Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes
  - Yttrium Zirconium Oxide
    - 64417-98-7
    - Not Listed
Germany - Water Classification (VwVwS) - Annex 3

- Yttrium Zirconium Oxide  64417-98-7  Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male
- Yttrium Zirconium Oxide  64417-98-7  Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Revision Date  15/October/2015
Preparation Date  18/August/2015

Disclaimer/Statement of Liability
- Reasonable care has been taken in the preparation of this information, but the supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Safety Data Sheet before handling product.

Key to abbreviations
NDA = No data available