SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
- Trade name: Magnesium Zirconate
- Product code: 9897, 7008, 7017, #233, #233PW

1.2 Relevant identified uses of the substance or mixture and uses advised against
- Application of the substance / the mixture: Thermal Spray Powder
- Uses advised against: No further relevant information available.

1.3 Details of the supplier of the Safety Data Sheet
- Manufacturer/Supplier: Saint Gobain Coating Solutions
  One New Bond Street
  Worcester, MA 01615-0137
  (508) 795-5000
  CeramicMaterials@saint-gobain.com

1.4 Emergency telephone number: ChemTel
  (800)255-3924 (North America) +1 (813)248-0585 (International)
  1-300-954-583 (Australia)
  0-800-591-6042 (Brazil)
  400-120-0751 (China)
  000-800-100-4086 (India)
  800-099-0731 (Mexico)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
- Classification according to Regulation (EC) No 1272/2008
  The product is not classified as hazardous according to the Globally Harmonized System (GHS).
  The product is not classified as hazardous according to OSHA GHS regulations within the United States.
  The product is not classified as hazardous according to the CLP regulation.

2.2 Label elements
- Labelling according to Regulation (EC) No 1272/2008 Not Regulated
- Hazard pictograms Not Regulated
- Signal word Not Regulated
- Hazard statements Not Regulated.
- Precautionary statements Not Regulated.
- Additional information: Long term inhalation of product dust may be harmful.

2.3 Other hazards
There are no other hazards not otherwise classified that have been identified.
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.
SECTION 3: Composition/information on ingredients

- 3.2 Mixtures

<table>
<thead>
<tr>
<th>Components:</th>
<th>CAS: 1314-23-4</th>
<th>zirconium oxide substance with a Community workplace exposure limit</th>
<th>73-77%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EINECS: 215-227-2</td>
<td>Reg.nr.: 01-2119486976-14-XXXX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| | CAS: 1309-48-4 | Magnesium oxide substance with a Community workplace exposure limit | 20-24% |
| | EINECS: 215-171-9 | Index number: 025-199-09-0 | |

| | CAS: 12055-23-1 | Hafnium dioxide substance with a Community workplace exposure limit | 1-3% |
| | EINECS: 235-013-2 | Reg.nr.: 01-2119967820-31-XXXX | |

Additional information:
For the listed ingredient(s), the identity and/or exact percentages are being withheld as a trade secret.

SECTION 4: First aid measures

- 4.1 Description of first aid measures
  - After inhalation:
    Supply fresh air; consult doctor in case of complaints.
    Provide oxygen treatment if affected person has difficulty breathing.
  - After skin contact:
    Brush off loose particles from skin.
    Wash with soap and water.
    If skin irritation is experienced, consult a doctor.
  - After eye contact:
    Remove contact lenses if worn, if possible.
    Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
  - After swallowing:
    Rinse out mouth and then drink plenty of water.
    Do not induce vomiting; call for medical help immediately.

- 4.2 Most important symptoms and effects, both acute and delayed
  - Breathing difficulty
  - Coughing
  - Slight irritant effect on skin and mucous membranes.
  - Slight irritant effect on eyes.
  - May cause gastro-intestinal irritation if ingested.

- 4.3 Indication of any immediate medical attention and special treatment needed
  - Treat symptomatically.

SECTION 5: Firefighting measures

- 5.1 Extinguishing media
  - Suitable extinguishing agents:
SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation
Avoid formation of dust.
Use personal protective equipment as required.

6.2 Environmental precautions
Avoid release to the environment.

6.3 Methods and material for containment and cleaning up
Pick up mechanically.
Send for recovery or disposal in suitable receptacles.

6.4 Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Use only outdoors or in a well-ventilated area.
Prevent formation of dust.
Avoid breathing dust.

7.2 Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles:
Storage area should be dry and well-ventilated.

Information about storage in one common storage facility: Store away from foodstuffs.

7.3 Specific end use(s)
No further relevant information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Ingredients with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>1314-23-4 zirconium oxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL (Canada)</td>
</tr>
</tbody>
</table>

(Cont'd. on page 4)
### 8.2 Exposure controls

**General protective and hygienic measures:**

The usual precautionary measures are to be adhered to when handling chemicals. Keep away from foodstuffs, beverages and feed. Avoid close or long term contact with the skin.
Avoid contact with the eyes.

- **Respiratory protection:**
  Not required under normal conditions of use.
  Wear appropriate NIOSH or EU approved respirator when ventilation is inadequate and occupational exposure limits are exceeded.

- **Protection of hands:**
  Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.

- **Eye protection:**
  Safety glasses

  Follow relevant national guidelines concerning the use of protective eyewear.

- **Body protection:**
  Not required under normal conditions of use.

- **Limitation and supervision of exposure into the environment:**
  Avoid release to the environment.

- **Risk management measures:**
  No further relevant information available.

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

- **Appearance**
  - Form: Powder
  - Colour: Whitish
  - Odour: Odourless
  - Odour threshold: Not determined.

- **pH-value:** Not applicable.

- **Melting point/freezing point:** Not determined.

- **Initial boiling point and boiling range:** Not determined.

- **Flash point:** Not applicable.

- **Flammability (solid, gas):** Not determined.

- **Auto/Self-ignition temperature:** Not determined.

- **Decomposition temperature:** Not determined.

- **Explosive properties:** Product does not present an explosion hazard.

- **Explosion limits**
  - Lower: Not determined.
  - Upper: Not determined.

- **Oxidising properties:** Not determined.

- **Vapour pressure:** Not determined.

- **Density**
  - Relative density: 1.4-3.2
  - Vapour density: Not applicable.
  - Evaporation rate: Not applicable.
Trade name: Magnesium Zirconate

- Solubility in / Miscibility with water: Insoluble.
- Partition coefficient: n-octanol/water: Not determined.
- Viscosity
  - Dynamic: Not applicable.
  - Kinematic: Not applicable.
- 9.2 Other information No further relevant information available.

SECTION 10: Stability and reactivity

- 10.1 Reactivity No further relevant information available.
- 10.2 Chemical stability Stable under normal temperatures and pressures.
- Thermal decomposition / conditions to be avoided: No decomposition if used and stored according to specifications.
- 10.3 Possibility of hazardous reactions Reacts with halogenated compounds.
- 10.4 Conditions to avoid Moisture.
  Prevent formation of dust.
- 10.5 Incompatible materials No further relevant information available.
- 10.6 Hazardous decomposition products No dangerous decomposition products known.

SECTION 11: Toxicological information

- 11.1 Information on toxicological effects
  - Acute toxicity: Based on available data, the classification criteria are not met.
  - LD/LC50 values relevant for classification: None.
  - Primary irritant effect
  - Skin corrosion/irritation: Slight irritant effect on skin and mucous membranes.
  - Serious eye damage/irritation: Slight irritant effect on eyes.
  - Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
- Carcinogenic categories
  - IARC (International Agency for Research on Cancer): None of the ingredients are listed.
- Probable routes of exposure:
  - Ingestion.
  - Inhalation.
  - Eye contact.
  - Skin contact.
- Repeated dose toxicity: Long term inhalation of product dust may be harmful.
- Germ cell mutagenicity: Based on available data, the classification criteria are not met.
- Carcinogenicity: Based on available data, the classification criteria are not met.
- Reproductive toxicity: Based on available data, the classification criteria are not met.
· STOT-single exposure: Based on available data, the classification criteria are not met.
· STOT-repeated exposure: Based on available data, the classification criteria are not met.
· Aspiration hazard: Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· 12.1 Toxicity
  · Aquatic toxicity: No further relevant information available.
· 12.2 Persistence and degradability: No further relevant information available.
· 12.3 Bioaccumulative potential: No further relevant information available.
· 12.4 Mobility in soil: No further relevant information available.
· 12.5 Results of PBT and vPvB assessment
  · PBT: Not applicable.
  · vPvB: Not applicable.
· 12.6 Other adverse effects: No further relevant information available.

SECTION 13: Disposal considerations

· 13.1 Waste treatment methods
  · Recommendation
    Contact waste processors for recycling information.
    The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.
  · Uncleaned packaging:
    · Recommendation: Disposal must be made according to official regulations.

SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1 UN-Number</th>
<th>DOT, ADR, IMDG, IATA</th>
<th>Not Regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2 UN proper shipping name</td>
<td>DOT, ADR, IMDG, IATA</td>
<td>Not Regulated</td>
</tr>
<tr>
<td>14.3 Transport hazard class(es)</td>
<td>DOT, ADR, IMDG, IATA</td>
<td>Class</td>
</tr>
<tr>
<td>14.4 Packing group</td>
<td>DOT, ADR, IMDG, IATA</td>
<td>Not Regulated</td>
</tr>
<tr>
<td>14.5 Environmental hazards:</td>
<td>Marine pollutant:</td>
<td>No</td>
</tr>
</tbody>
</table>
### Trade name: Magnesium Zirconate

#### SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **United States (USA)**
  - **SARA**
    - **Section 302 (extremely hazardous substances):**
      None of the ingredients are listed.
    - **Section 355 (extremely hazardous substances):**
      None of the ingredients are listed.
    - **Section 313 (Specific toxic chemical listings):**
      None of the ingredients are listed.
  - **TSCA (Toxic Substances Control Act):**
    All ingredients are listed.
  - **Proposition 65 (California):**
    - **Chemicals known to cause cancer:**
      None of the ingredients are listed.
    - **Chemicals known to cause developmental toxicity for females:**
      None of the ingredients are listed.
    - **Chemicals known to cause developmental toxicity for males:**
      None of the ingredients are listed.
    - **Chemicals known to cause developmental toxicity:**
      None of the ingredients are listed.
  - **EPA (Environmental Protection Agency)**
    None of the ingredients are listed.
  - **IARC (International Agency for Research on Cancer)**
    None of the ingredients are listed.
  - **Canadian Domestic Substances List (DSL) (Substances not listed)**
    All ingredients are listed.
  - **Directive 2012/18/EU Named dangerous substances - ANNEX I**
    None of the ingredients are listed.
  - **Other regulations, limitations and prohibitive regulations**
    - **Substances of very high concern (SVHC) according to REACH, Article 57**
      None of the ingredients are listed.
Trade name: Magnesium Zirconate

**SECTION 16: Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

**Abbreviations and acronyms:**

- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- GHS: Globally Harmonised System of Classification and Labelling of Chemicals
- EINECS: European Inventory of Existing Commercial Chemical Substances
- ELINCS: European List of Notified Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- PBT: Persistent, Bio-accumulable, Toxic
- SVHC: Substances of Very High Concern
- vPvB: very Persistent and very Bioaccumulative

**Sources**

- Website, European Chemicals Agency (echa.europa.eu)
- Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
- Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
- Safety Data Sheets, Individual Manufacturers

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