SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

GHS Product Identifier: GZM, TZM, EZM, Zircon flour, Sand A
Chemical Name: Zirconium Silicate
Recommended Applications: Used singularly or as a component in ceramics, refractories, investment casting and high temperature coatings.

Synonyms:
Milled zircon

Manufacturer Information:
TAM Ceramics, LLC (#220821)
4511 Hyde Park Blvd Niagara Falls, NY 14305
Phone Number: 716-278-9400

Website:
www.tamceramics.com

CHEMICAL EMERGENCY CHEMTREC 24 HOUR EMERGENCY TELEPHONE
Spill, Leak, Fire, Exposure or Accident
DOMESTIC NORTH AMERICA 800-424-9300
INTERNATIONAL CALL: 703-527-3887
Collect Calls Accepted

SECTION 2. HAZARDS IDENTIFICATION

GHS Pictogram:

Signal word:
WARNING

GHS classification:
Eye irritation, Category 2
Skin irritation, Category 2

Hazard Statement:
Inert particles can be slightly, mechanically irritating to the eyes.
Prolonged skin contact may cause skin irritation or dermatitis.
Overexposure by inhalation may cause respiratory irritation.

Precautionary Statement:
Wash hands thoroughly after handling. Minimize exposure by wearing protective gloves, clothing, eye protection and respiratory masks. Have a clean change of works clothes readily available. Avoid dust formation and utilize good housekeeping practices.

Route of Exposure:
Eyes, skin, inhalation and ingestion.

Potential Health Effects:
Eye: May cause a slight irritation.
Skin: May cause a slight irritation.
Inhalation: Prolonged inhalation may cause respiratory tract irritations.
Ingestion: May irritate digestive tract if swallowed.

Chronic toxicity:
Excessive inhalation of dust may cause chemical pneumonitis, cyanosis, and pulmonary edema. This product contains amorphous silica. Overexposure by inhalation of respirable dust may cause respiratory problems including pneumoconiosis. This product contains trace quantities (130 to 145 pCi/g) of naturally occurring Uranium and Thorium. Overexposure by inhalation of respirable dust containing these radioactive elements may cause lung cancer. This product contains zirconium dioxide and it has been reported

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS-No</th>
<th>EC number</th>
<th>Weight %</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Silicate</td>
<td>14940-68-2</td>
<td>215-227-2</td>
<td>95 - 99%</td>
<td>5 mg/m³ TWA as Zr</td>
<td>10 mg/m³ STEL as Zr</td>
</tr>
<tr>
<td>Kyanite</td>
<td>1302-76-7</td>
<td>215-106-4</td>
<td>1 - 5%</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Quartz silica</td>
<td>14808-60-7</td>
<td>238-878-4</td>
<td>0.1 - 0.5%</td>
<td>Total Dust</td>
<td>30 mg/m³ / (%SiO2 +2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Respirable</td>
<td>0.05 mg/m³ TWA</td>
</tr>
</tbody>
</table>

OSHA particulate (not otherwise regulated) limit: 5 mg/m³ (respirable): 15 mg/m³ (total).
This product contains trace quantities of naturally occurring radioactive uranium, thorium and radium (<0.042% total). Overexposure by inhalation to respirable dusts containing uranium, thorium and radium may cause cancer, however, observance of the OSHA limit for respirable dusts of 5 mg/m³ will ensure the use of this product to be well below the regulatory limits established for these components.

Methods for cleaning up: Use approved industrial vacuum cleaner for removal. Wear personal protective equipment. Dispose of promptly.
SECTION 1. IDENTIFICATION
Common name: Zirconium Silicate
Synonyms: Zirconium Silicate
Other names: Zirconium Silicate

SECTION 2. HAZARDS IDENTIFICATION
Hazard class: Not applicable
GHS classification: Not classified
IARC: Group 3 (Not classifiable as a human carcinogen)
OSHA: Not listed
ACGIH: Not listed
NTP: Not listed

SECTION 3. REACTIVITY
Stability: Stable under normal conditions.
Incompatible materials: None known.

SECTION 4. FIRST AID MEASURES
Eye contact: Rinse eyes immediately with plenty of water on eye surfaces and under eyelids. Get medical attention if irritation develops.
Skin contact: Wash off immediately with soap and plenty of water. Remove and wash contaminated clothing before re-use. If symptoms persist, call a physician.
Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. If symptoms persist, call a physician.
Ingestion: Drink plenty of water. Consult a physician if necessary. Do not induce vomiting without medical advice.

SECTION 5. FIRE-FIGHTING MEASURES
Flash point: No data available
Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES
Personal precautions: Avoid dust formation. Evacuate area of all unnecessary personnel. Avoid contact with skin, eyes and clothing. Use personal protective equipment.
Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Do not flush into surface water or sanitary sewer system.
Methods for cleaning up: Use approved industrial vacuum cleaner for removal. Wear personal protective equipment. Dispose of promptly

SECTION 7. HANDLING AND STORAGE
Handling: Handle in accordance with good industrial hygiene and safety practice. Avoid dust formation. Avoid contact with skin, eyes and clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Provide appropriate exhaust ventilation at places where dust is formed. Remove all sources of ignition. Wash hands thoroughly before eating, drinking or smoking.
Storage: Keep container tightly closed in a dry and well-ventilated place.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION
Engineering measures: Ensure adequate ventilation, especially in confined areas. Airborne dust levels should be controlled by physical enclosure during abrasive blasting operation. Refer to 29 CFR 1910.94 Ventilation (a) Abrasive Blasting. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate. Wear NIOSH approved respirator to limit exposure to NORM. Use a HEPA-filtered approved for radonucleides where airborne concentrations are expected to exceed exposure limits. Use a supplied-air respirator if there is any potential for an uncontrolled release, exposure levels are not known, or where air purifying respirators may not provide adequate protection. OSHA requires a continuous flow air-line supplied respirator with hood for protection in abrasive blasting operations. Refer to OSHA Standards 29 CFR 1910.94.
Hand protection: Impervious gloves
Skin and body protection: Lightweight protective clothing. Chemical-resistant gloves and impermeable body covering to minimize skin contact. Contaminated work clothing should not be allowed out of the workplace. Keep working clothes separately. Remove and wash contaminated clothing before re-use.
Eye protection: Safety glasses with side-shields.
Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate. Wear NIOSH approved respirator to limit exposure to NORM. Use a HEPA-filtered approved for radonucleides where airborne concentrations are expected to exceed exposure limits. Use a supplied-air respirator if there is any potential for an uncontrolled release, exposure levels are not known, or where air purifying respirators may not provide adequate protection. OSHA requires a continuous flow air-line supplied respirator with hood for protection in abrasive blasting operations. Refer to OSHA Standards 29 CFR 1910.94.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
Color: Off White
Odor: Odorless
Odor threshold: No data available
Vapor pressure: No data available
Boiling point/range (°C): No data available
Flash point: No data available
Melting point/range (°C): 2100 - 2300
Flammability (solid, gas): No data available
Vapor pressure (mmHg): No data available
Physical state: Powder
Upper/lower flammability or explosive limits: No data available
Water solubility (mg/l): Insoluble
Vapor density: No data available
Relative density: No data available
Physical state: Powder
Molecular weight: No data available
Partition coefficient: n-octanol/water: No data available
pH: No data available
Auto-ignition temperature: No data available
Specific gravity (Water = 1): 4.7
Decomposition temperature: No data available
Evaporation rate (Water = 1): No data available
Viscosity: No data available
VOC content (%): No data available

SECTION 10. STABILITY AND REACTIVITY
Stability: Stable at normal conditions.
Polymerization: Will not occur.
Hazardous decomposition products: None under normal use.
Materials to avoid: None known.
Conditions to avoid: Avoid dust formation.

SECTION 11. TOXICOLOGICAL INFORMATION
Chronic toxicity: Contains crystalline silica which causes silicosis and lung cancer.
Carcinogenic effects: Respirable crystalline silica has been classified as a Group I (sufficient evidence in humans for carcinogenicity) carcinogenic by IARC and is listed by NTP as a substance which may reasonably be anticipated to be a carcinogen. Crystalline silica is also a known cause of silicosis, a non-cancerous lung disease caused by excessive exposure to crystalline silica. Listed by IARC, NTP and OSHA as a carcinogen.
Target Organ Effects:
Silica: Respiratory system
Zirconium: Skin, respiratory system.
Zirconium Silicate
ACGIH - Carcinogens: A4 - Not Classifiable as a Human Carcinogen
A4 - Not Classifiable as a Human Carcinogen (as Zr)
Quartz Silica
ACGIH - Carcinogens: A2 - Suspected Human Carcinogen
OSHA - Select Carcinogens: Present
NTP: Known Carcinogen
IARC - Group 1: Monograph 68, 1997 [inhaled in the form of quartz or cristobalite from occupational sources]

SECTION 12. ECOLOGICAL INFORMATION
Aquatic toxicity: No information available.
Persistence and degradability: No information available.
SECTION 13. DISPOSAL CONSIDERATIONS

**Waste from residues / unused products:** Waste must be disposed of in accordance with federal, state and local environmental control regulations. Where possible recycling is preferred to disposal or incineration. This product contains Naturally Occurring Radioactive Materials (NORM). Consult and comply with current regulations.

SECTION 14. TRANSPORT INFORMATION

**DOT Classification (U.S.)** Not a DOT controlled material (United States).

Proper shipping name: Not regulated

**TDG (Canada)**

Proper shipping name: Not regulated.

SECTION 15. REGULATORY INFORMATION

**U.S. Regulations:**

Not subject to the provisions of SARA 313 Title III

Not subject to TSCA 12(b) Export Notification

**State Regulations:**

This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

**Zirconium Silicate (95 - 99%)**

- **NJRTK:** sn 2047
- **PARTK:** Listed
- **Cal Prop65:** Radionuclides

**Kyanite (1 - 5%)**

- **NJRTK:** sn 0054 (dust and fume)
- **PARTK:** Listed

**Quartz silica (0.1 - 0.5%)**

- **NJRTK:** sn 1660
- **PARTK:** Listed
- **Cal Prop65:** carcinogen, initial date 10/1/88 (airborne particles of respirable size)

**Canadian WHMIS**

- WHMIS hazard class: D2A Very toxic materials. D2B Toxic materials.

**Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>WHMIS Ingredient Disclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium Silicate (95 - 99%)</td>
<td>1%</td>
</tr>
<tr>
<td>Quartz silica (0.1 - 0.5%)</td>
<td>1%</td>
</tr>
</tbody>
</table>

**International Inventories**

- TSCA 8(b): All the ingredients are on the TSCA list.
- Canadian DSL: All the ingredients are on the DSL.
- EINECS: All the ingredients are on the EINECS list.
- Philippines (PICCS): Not listed.
- Japan (ENCS): Not listed.
- Korea (KECL): Listed.
- China (IECS): Listed.
- Australia (AICS): Listed.

SECTION 16. OTHER INFORMATION

For Industrial Use Only

**National Fire Protection Association (U.S.A.):**

- **Health:** 1
- **Fire:** 0
- **Physical Hazard:** 0
- **PPE:** X

**Prepared by:** Product Manufacturer, TAM Ceramics Group of NY, LLC

**Protective Equipment:** Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

The information and recommendations contained in this Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the SDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

Last Updated: May 2015

End of Safety Data Sheet