



Date of Preparation: 20 JAN 2003

Review Date: 14 JAN 2004

Conforms to: O.S.H.A HCS - W.H.M.I.S

MSDS No. 104

## 1. Product and Company Identification

**Manufacturer/Supplier:**

AluChem, Inc.  
1 Landy Lane  
Reading, OH 45215 USA

Telephone: 513-733-8519  
Fax: 513-733-3123  
Emergency: 800-336-8519

**Product Name:** ZIRCON FLOUR

**Other Designations:**

All ACZ -200, ACZ-325 and ACZ-400 products – Standard (SAS) and Prime (SAP) grades

**Uses:** Refractory material, Ceramic material, Foundry sand

## 2. Composition / Information on Ingredients

CAS No.	Chemical or Component	% by weight
14940-68-2	Zircon (Zirconium Silicate)	>98
1317-80-2	Rutile (Titanium Dioxide)	0.1 – 0.3
14808-60-7	Quartz (Silicon Dioxide)	0.1 – 0.5

**Significant Trace Elements Contained in the Crystalline Structure of Zircon:**

Uranium	286 – 343 ppm	Thorium	116 - 157 ppm
Radium (226)	94 – 116 pCi/g	Radium (228)	13 – 16 pCi/g
Hafnium	1.1 %	Other Decay Products:	In secular equilibrium

## 3. Hazards Identification

**Emergency Overview:**

Off white to buff in color with no odor. Dust inhalation may be harmful to the respiratory system. This product contains naturally occurring radioactive uranium, thorium and radium. Over exposure to dusts containing radioactive uranium, thorium and radium may cause lung cancer. This product also contains respirable quartz. The predominant effect of overexposure to airborne quartz in humans is silicosis. Individuals with preexisting conditions of the lungs may have increased susceptibility to the toxicity of excessive exposure.

**MATERIAL SAFETY DATA SHEET****Zircon Flour**

Date of Preparation: 20 JAN 2003

MSDS No. 104

Review Date: 14 JAN 2004

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Observance of the 5mg/m<sup>3</sup> OSHA PEL for respirable dust will ensure that use of this product is within limits established for respirable quartz. Zircon is exempt from NRC (Nuclear Regulatory Commission) regulations for source material per 10 CFR 40.13(b) since it falls under the definition of unprocessed material containing less than 0.05% uranium or thorium. However, observance of 2.8 mg/m<sup>3</sup> of respirable dust will under voluntary guidelines ensure that intake is less than 10 % of the Annual Limits on Intake (ALI) specified in 10 CFR 20.1502(b) and NRC (Nuclear Regulatory Commission) standards for Protection Against Radiation for thorium, uranium, radium and radioactive daughter decay products.

**Ingestion:** May cause mild irritation.

**Inhalation:** Addressed above.

**Eye Contact:** May cause mild irritation.

**Skin Contact:** May cause mild irritation.

**Hazard Description**

**Medical conditions generally aggravated by exposure :**

Asthma, chronic lung conditions or diseases and skin rashes.

**Toxicological Data:** See item 11.

**Carcinogenicity:** Quartz is listed by the IARC and NTP as known to be carcinogenic to humans .

**4. First Aid Measures****Ingestion:**

No specific intervention is indicated. If discomfort is experienced, a physician or other qualified medical personnel should be consulted.

**Inhalation:**

Remove to fresh air. If irritation develops consult a physician or other qualified medical personnel.

**Eye Contact:**

Flush eyes with ample amounts of water for at least 15 minutes. Consult a physician or other qualified medical personnel if irritation develops and persists.

**Skin Contact:**

Wash with soap and water to remove any contamination.

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**5. Fire Fighting Measures****Fire / Explosion Hazards:**

This product does not present fire or explosion hazards as supplied.

**Extinguishing Media:**

As deemed suitable by the environment.

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**MATERIAL SAFETY DATA SHEET****Zircon Flour**

Date of Preparation: 20 JAN 2003

MSDS No. 104

Review Date: 14 JAN 2004

---

**Fire Fighting Equipment:**

Respiratory and eye protection required for fire fighting personnel. Full protective equipment (Bunker Gear) and self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires.

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**6. Accidental Release Measures****Person-related Safety Precautions:**

Avoid contact with skin and eyes.

**Cleaning and Collecting Spills:**

Vacuum or sweep material and place in a disposal container. Avoid dusting. Ensure adequate ventilation.

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**7. Handling and Storage****Handling:**

Ensure good ventilation in all work areas.  
Minimize dusting and dust accumulation.

**Storage:**

No special requirements.

**8. Exposure Controls and Personal Information****Exposure Guidelines:**

Zircon (Zirconium Silicate) (CAS# 14940-68-2)

ACGIH TLV 5 mg/m<sup>3</sup>, 8 hr. TWA, as Zr

STEL 10 mg/m<sup>3</sup>, as Zr

OSHA PEL 5 mg/m<sup>3</sup>, 8 hr. TWA, as Zr

Quartz (Silicon Dioxide) (CAS# 14808-60-7)

ACGIH TLV 0.1 mg/m<sup>3</sup>, 8 hr. TWA, respirable dust

**Respiratory Protection:**

Avoid breathing dust. Use NIOSH/MSHA approved respiratory protection in case of insufficient ventilation and where exposure guidelines may be exceeded.

**Skin Protection:**

Wear suitable gloves and appropriate clothing to avoid skin irritation or injury.

**Eye Protection:**

Use of safety glasses with full side shields is always recommended. Where air turbulence may be present, goggles are also recommended.

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**MATERIAL SAFETY DATA SHEET****Zircon Flour**

Date of Preparation: 20 JAN 2003

MSDS No. 104

Review Date: 14 JAN 2004

---

**9. Physical and Chemical Properties****Appearance:**

Buff to off white colored sand or powder

**Molecular Formula:**ZrSiO<sub>4</sub>**Molecular Weight:**

183.26

**Physical State:**

Solid

**Odor:**

None

**Melting Point:**

2250°C (4082°F)

**Boiling Point:**

Not Determined.

**Flash Point:**

Not Applicable.

**Solubility in Water:**

Negligible (less than 0.1%)

**Density:**4.2 – 4.8 g/cm<sup>3</sup>**Bulk Density:**2700 kg/m<sup>3</sup> (168 lb/ft<sup>3</sup>)**pH - 20°C:**

4 - 8 (10g/100ml)

**Autoignition:**

Product is not self igniting.

**Danger of Explosion:**

None present.

**Vapor Pressure:** Not applicable.**Vapor Density:** Not applicable.**Evaporation Rate:** Not applicable.**Oxidizing Properties:** Not applicable.**Lower Flammable Limit:** None.**Upper Flammable Limit:** None.**Odor Threshold:** Not determined.**Partition Coefficient:** Not applicable.

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**10. Stability and Reactivity****Stability:** Product is stable.**Corrosivity:** Non-corrosive.**Conditions to Avoid:** None noted.**Incompatibilities with Other Materials:** None noted.**Hazardous Decomposition Products:** Zircon will disassociate to Zirconium Oxide (ZrO<sub>2</sub>) and Silicon Dioxide (SiO<sub>2</sub>) when heated in excess of 1540 °C.**Hazardous Polymerization:** Will not occur.

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**11. Toxicological Information****Acute Toxicity –****Primary Irritant Effect:****Inhalation:** Irritant to the upper respiratory tract.**On the skin:** Irritant to skin and mucous membranes.**On the eyes:** Irritating effect.**Sensitization:** No sensitizing effects known.**Chronic Toxicity-****Inhalation:** Repeated inhalation of excessive amounts of dust may produce granulomas, varying degrees of respiratory irritation, silicosis and/or lung cancer.

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**MATERIAL SAFETY DATA SHEET****Zircon Flour**

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MSDS No. 104

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**Additional Toxicological Information:**

RTECS No. ZH9000000 – Zircon

RTECS No. VV7330000 - Quartz

**12. Ecological Information****General Notes:**

Generally, no adverse conditions are anticipated, but may require compliance with governmental restrictions and permitting requirements prior to release.

**13. Disposal Considerations****Product -**

**Recommendation:** Collect in containers or covered dumpsters. If reuse or recycling is not possible, material may be disposed of at an industrial landfill, subject to local regulations and restrictions. Based on radionuclide content, some localities and jurisdictions may require disposal as NORM (naturally occurring radioactive material).

**Uncleaned packaging -**

**Recommendation:** Disposal must be made according to official regulations.

**RCRA Status:**

If discarded in its purchased form, this product would not be a hazardous waste either by listing or characteristic nor is it federally (USA) regulated. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste (40 CFR 261.20-24 or state equivalent in the USA).

**14. Transport Information**

<b>U.S. Department of Transportation (DOT):</b>	Not regulated
<b>Canadian TDGR Hazard Class and PIN:</b>	Not regulated
<b>Land Transport ADR/RID (cross-boarder):</b>	Not regulated
<b>Maritime Transport IMDG:</b>	Not regulated
<b>Marine Pollutant:</b>	Not listed
<b>Air transport ICAO-TI and IATA-DGR:</b>	Not regulated
<b>Placards:</b>	Not applicable

**15. Regulations****U.S. Federal Regulations:**

TSCA Chemical Inventory Status: All components of this product are listed.

**SARA Title III:**

Section 302 Extremely Hazardous Substances: None.

Section 304 Emergency Release Reporting: None.

Section 311/312 Hazardous Categories: Chronic.

Section 313 Toxic Categories: None.

**MATERIAL SAFETY DATA SHEET****Zircon Flour**

Date of Preparation: 20 JAN 2003

MSDS No. 104

Review Date: 14 JAN 2004

CERCLA Reportable Quantity: None.

Clean Air Act of 1990 – Title VI: This material does not contain nor was it manufactured using ozone depleting chemicals.

**Canadian Regulations:**

WHMIS Classification: D-2A Very toxic material causing other effects.

DSL (Domestic Substance List): All components of this product are listed on the DSL.

NPRI (National Pollutant Release Inventory): Not subject to mandatory reporting requirements.

IDL (Ingredient Disclosure List): Zircon and quartz are listed on the IDL.

Note: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (Canada) and this MSDS contains all the information required by the Controlled Products Regulations (Canada).

**European Union Classification:**

Warning Symbol: None.

EINECS:

**Zircon****Quartz****Rutile**

Warning Word: None.

239-019-6

238-878-4

215-282-2

Risk Phrases: None.

Safety Phrases: None.

**USA State Regulations:**

California Proposition 65: Quartz and radionuclides are currently listed on the California List of Known Carcinogens causing cancer.

Massachusetts Right to Know List: Quartz and Zircon are listed.

Massachusetts Hazardous Substance Code: None

New Jersey Right to Know List: Quartz and Zircon are listed

Pennsylvania Right to Know List: Quartz, Zircon and Rutile are listed.

**16. Other Information****Hazard Ratings -****NFPA® Ratings:** Health: 2 Flammability: 0 Reactivity: 0 Special: E**HMIS® III Codes :** Health: 2 Flammability: 0 Physical Hazard: 0 PPE: \*

\*Note: PPE (Personal Protective Equipment) designation to be supplied by user depending upon use in their specific situation. HMIS guidelines do not permit this designation to be specified by the manufacturer/supplier – only by the end user.

**Department Issuing MSDS:**

Technical Services

AluChem, Inc.

1 Landy Lane

Reading, OH 45215 USA

Revision #1 Date: 20 JAN 2003 Supersedes 01 JAN 2002

All sections revised.

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It is the user's responsibility to determine for themselves the suitability of any material for a specific purpose, whether alone or in combination with any other products, and to adopt such safety precautions as may be necessary. This shall in no way establish a legally valid contractual relationship.

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**ABBREVIATIONS:**

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ALI	Annual Limits on Intake
CAS	Chemical Abstract Service
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	United States Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	United States Department of Transportation
DSL	Canadian Domestic Substances List
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	United States Environmental Protection Agency
IDL	Canadian Ingredient Disclosure List
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IATA-DRG	International Air Transport Association – Dangerous Goods Regulations
ICAO	International Civil Aviation Organization
ICAO-TI	International Civil Aviation Organization – Technical Instructions on the Safe Transport of Dangerous Goods by Air
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
NDSL	Canadian Non-domestic Substances List
NIOSH	National Institute for Occupational Safety and Health (USA)
NORM	Naturally Occurring Radioactive Materials
NTP	National Toxicology Program (USA)
OEL	Occupational Exposure Limit
OSHA	United States Occupational Health and Safety Administration
PIN	Product Identification Number
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act (USA)
RID	European Agreement Concerning the International Carriage of Dangerous Goods by Rail
RTECS	The Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
TDGR	Transportation of Dangerous Goods Regulations
TLV	Threshold Limit Values
TSCA	Toxic Substances Control Act (USA)
TWA	Time Weighted Average

cm = centimeter, ft = feet, g = gram, in = inch, kg = kilogram, lb = pound, ml = milliliter,  
pCi/g= pico curies per gram, > = greater than