

# ZIRCAR Refractory Composites, Inc.

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## MATERIAL SAFETY DATASHEET

No.: MSDS-5

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## 1. Product Identification

<b>Trade Name:</b>	Refractory Sheet Products	<b>Chemical Name:</b>	Mixture
<b>Group 1</b>	<b>Synonym:</b> Reinforced Alumina Matrix Composite	<b>Molecular Formula:</b> $\text{Al}_2\text{O}_3 \bullet \text{SiO}_2 \bullet \text{CaO}$	
	<b>Types:</b> RS-100 RS-101 RS-200 RS-201 RS-202 LFS RS-1200		
<b>Group 2</b>	<b>Synonym:</b> Alumina/Ceramic Composite Textiles	<b>Molecular Formula:</b> $\text{SiO}_2 \bullet \text{CaO} \bullet \text{B}_2\text{O}_3 \bullet \text{Al}_2\text{O}_3$	
	<b>Types:</b> RS CLOTH RS TAPE		
<b>Group 3</b>	<b>Synonym:</b> Alumina/Ceramic Composite Textile Moldable Sleeving	<b>Molecular Formula:</b> $\text{SiO}_2 \bullet \text{CaO} \bullet \text{B}_2\text{O}_3 \bullet \text{Al}_2\text{O}_3$	
	<b>Types:</b> RS MOLDABLE SLEEVING		
<b>Group 4</b>	<b>Synonym:</b> Alumina Molding Compound	<b>Molecular Formula:</b> $\text{Al}_2\text{O}_3 \bullet \text{SiO}_2$	
	<b>Types:</b> MOLD MIX 6		
<b>Group 5</b>	<b>Synonym:</b> Alumina-Silica Moldable Insulating Product	<b>Molecular Formula:</b> $\text{SiO}_2 \bullet \text{Al}_2\text{O}_3 \bullet \text{CaO} \bullet \text{B}_2\text{O}_3 \bullet \text{MgO}$	
	<b>Types:</b> B-MOLDABLE		

## 2. Composition / Information on Ingredients

COMPONENT	Formula	Molecular Weight	CAS Number
Aluminum Oxide	Al <sub>2</sub> O <sub>3</sub>	101.96128	1344-28-1
Silica (amorphous)	SiO <sub>2</sub>	60.08	60676-86-0
Calcium Oxide	CaO	56.08	1305-78-8
Boron Oxide	B <sub>2</sub> O <sub>3</sub>	69.62	1303-86-0
Magnesium Oxide	MgO	40.31	1309-48-4

Groups from Section One	Components	% by Weight
<b>Group 1</b>	Al <sub>2</sub> O <sub>3</sub>	70-82
	SiO <sub>2</sub>	12-18
	CaO	6-7
<b>Groups 2 and 3</b>	Al <sub>2</sub> O <sub>3</sub>	66
	SiO <sub>2</sub>	22
	CaO	8
	B <sub>2</sub> O <sub>3</sub>	4
<b>Group 4</b>	Al <sub>2</sub> O <sub>3</sub>	49
	SiO <sub>2</sub>	5
<b>Group 5</b>	SiO <sub>2</sub>	41
	Al <sub>2</sub> O <sub>3</sub>	33
	CaO	15
	B <sub>2</sub> O <sub>3</sub>	7
	MgO	2

<b>EXPOSURE GUIDELINES: Aluminum Oxide</b>	
OSHA PEL as 8 hr TWA	15/5 mg/m <sup>3</sup> Total dust/Respirable Fraction
ACGIH PEL as 8 hr TWA	10 mg/m <sup>3</sup> Inhalable particulate with no asbestos and <1% crystalline silica
Canadian PEL as TWA	5 mg/m <sup>3</sup>
Carcinogenicity by ACGIH	Group A4, Not classifiable as a human carcinogen

<b>EXPOSURE GUIDELINES: Silica (amorphous)</b>	
OSHA PEL as 8 hr TWA	20 mppcfa, 80 mg/m <sup>3</sup>
NIOSH PEL as 8 hr TWA	6 mg/m <sup>3</sup>
Canadian PEL as TWA	5/2 mg/m <sup>3</sup> Total mass/Respirable Mass
ILDH Level by SCPC	3000 mg/m <sup>3</sup>
Carcinogenicity by ACGIH	Group 3

<b>EXPOSURE GUIDELINES: Calcium Oxide</b>	
OSHA PEL as 8 hr TWA	5 mg/m <sup>3</sup>
ACGIH PEL as 8 hr TWA	2 mg/m <sup>3</sup>

<b>EXPOSURE GUIDELINES: Boron Oxide</b>	
OSHA PEL as 8 hr TWA	15/5 mg/m <sup>3</sup> Total Dust/Respirable Fraction
ACGIH TWA	10 mg/m <sup>3</sup>

<b>EXPOSURE GUIDELINES: Magnesium Oxide</b>	
OSHA PEL as 8 hr TWA	15 mg/m <sup>3</sup>
ACGIH PEL as 8 hr TWA	15 mg/m <sup>3</sup>

### 3. Hazard Identification

<b>TARGET ORGANS:</b> Skin, eyes, and lungs.	
<b>Emergency Overview</b>	
<b>CAUTION:</b> Handling or machining of these products may produce respirable dust particles. Dust may irritate eyes, skin respiratory tract.	
<b>Inhalation</b>	Dust may cause irritation or soreness of throat and nose.
<b>Eye Contact</b>	Dust may cause temporary irritation or inflammation.
<b>Skin Contact</b>	May cause temporary dryness, irritation or rash.
<b>Ingestion</b>	Ingestion is unlikely. May cause gastrointestinal disturbances. Never induce vomiting without the advice of a physician.
<b>Medical Conditions Aggravated by Exposure:</b> Respiratory effects may be aggravated by smoking. Pre-existing respiratory problems may be aggravated by dust.	

### 4. First Aid Measures

**Inhalation:** Remove to fresh air. Rinse mouth to clear throat and expel liquid. Blow nose to evacuate dust. Consult a physician if irritation persists.

**Eye Contact:** Do not rub eyes. Keep hands or contaminated body parts away from eyes. Remove contact lenses. Flush with water. If irritation persists, consult a physician.

**Skin Contact:** Wash with soap and water. For dryness, a skin cream may be helpful. Do not apply anything to a rash. Consult a physician if irritation persists.

**Ingestion:** Do not induce vomiting without advice of a physician. Seek medical attention.

**Note to Physicians:** Aluminum Oxide dusts have caused no systemic or pathological problems. The material is inert in the body. Some individuals may experience allergic sensitivity reactions. These are generally limited to mild occupational dermatitis. Chronic inhalation may result in pleural plaques not associated with cancers. Other effects principally derived from physical abrasion.

These products contain a small percentage of amorphous silica, however, not in sufficient quantity to produce free crystalline silica upon heating. Dusts are therefore considered of the inert (nuisance) type and would not be expected to cause permanent damage to tissues on inhalation unless the exposure is severe. Chronic exposure may produce radioplaque deposits in the pulmonary system with little or no parenchymal reactions. Some individuals may exhibit allergenic reactions ranging from asthmatic symptoms to benign pneumoconiosis.

### 5. Fire Fighting Measures

Materials are not combustible.

## 6. Accidental Release Measures

**Spill Procedures:** Clean up procedures should minimize formation of airborne dusts. Remove dust by vacuuming using HEPA filtration where possible. Liquid and moist products (groups 3, 4, and 5) should be cleaned up with sponge, mop or cloth.

**Release into Air:** Prevent release of airborne particulates where possible. Not a regulated hazardous substance. See section 8 for appropriate engineering controls.

**Release into Water:** Release into water is not appropriate. Not a regulated hazardous substance. Landfill dusts and debris consistent with local regulations.

## 7. Handling and Storage

**Storage:** These materials are stable and may be stored indefinitely. Physical abrasion may produce small amounts of respirable dusts. Liquid and moist products (groups 3, 4, and 5) should be stored in a sealed container. See precautions under section 8.

**Normal Use:** Materials are stable under normal use and are not expected to produce significant hazardous by-products or emissions.

**Machining and Cutting:** These materials may produce respirable and nuisance dusts when machined or cut. See section 8 for exposure controls and personal protection during machining or installation procedures.

**High Temperature Conditions:** Service significantly above the product design temperature may increase friability and the possibility of generating airborne fibers or particulates. While not considered problematic during use, airborne fibers may complicate removal activities. It is recommended that product use be carefully matched to design parameters.

**After Service:** AS MANUFACTURED THIS PRODUCT IS AN ALUMINOSILICATE WHICH MAY TRANSFORM UPON HEATING (TEMPERATURES GREATER THAN 1000°C FOR EXTENDED PERIODS OF TIME) TO NON-HAZARDOUS MULLITE AND CRISTOBALITE (CAS # 14464-46-1), A FORM OF CRYSTALLINE SILICA. REMOVAL OF THIS PRODUCT AFTER USE MAY GENERATE DUSTS. PROLONGED OR REPEATED INHALATION OF RESPIRABLE FREE CRYSTALLINE SILICA DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS). THE IARC HAS CLASSIFIED CRYSTALLINE SILICA AS GROUP 2A, PROBABLE HUMAN CARCINOGEN. THERE IS SUFFICIENT EVIDENCE OF CARCINOGENICITY IN ANIMALS, BUT LIMITED EVIDENCE IN HUMANS. OSHA'S FINAL RULE LIMIT AND ACGIH'S TLV FOR RESPIRABLE CRISTOBALITE IS 0.05 mg/m<sup>3</sup>. APPROPRIATE VENTILATION AND RESPIRATORY PROTECTION SHOULD BE PROVIDED IN COMPLIANCE WITH OSHA STANDARDS. STRICT ADHERENCE TO RECOMMENDED SAFE WORK PRACTICES IS ADVISED. PRODUCT REMOVAL MUST CONSIDER THE POSSIBILITY OF USAGE ABOVE DESIGN TEMPERATURES.

Product removal must consider the possibility of usage above design temperatures. See section 8 for appropriate respiratory protection during removal.

## 8. Exposure Controls

<b>Engineering Controls:</b>	Use dust suppression controls. Local exhaust ventilation, point of generation dust collectic and/or down-draft work stations to minimize airborne dust generation are recommended when machining product.
<b>Respiratory Protection:</b>	Use appropriate protection pursuant to OSHA 29CFR 1910.134 and 29CFR 1926.103. Th following information is provided as a guide and reflects industry recommendations for

	control of dust.
<b>PPE Other</b>	Work clothes should be washed separately and the washing machine rinsed following use possible, do not take work clothes home following machining or removal activities that produce significant amounts of dust.
<b>Skin Protection</b>	Wear gloves, head coverings, and full body clothing to prevent skin irritation. Disposable clothing may be used. Store work clothes and street clothes separately.
<b>Eye Protection</b>	Wear safety glasses or chemical goggles to prevent eye contact. Do not wear contact lens without goggles. Do not get dust or liquids into eyes. Have eye washing facilities available when using products.
<p>These products are generally not hazardous during normal use. These guidelines are provided for special circumstances involved in machining , use and or after service removals.</p> <p>See section 7 for after service and section 13 for disposal recommendations.</p>	

## 9. Physical/Chemical Properties

	Form	Appearance	Odor	Solubility in H <sub>2</sub> O
<b>Group 1</b>	Rigid shapes	White to tan	Odorless	Insoluble
<b>Group 2</b>	Flexible composite textile	White	Odorless	Insoluble
<b>Group 3</b>	Moist moldable composite textile	White	Odorless	Insoluble
<b>Group 4</b>	Thick white paste	White	Odorless	Insoluble
<b>Group 5</b>	Moist blanket	White	Odorless	Insoluble

	S. G. (g/cc)	Melting Point	Vapor Pressure	% Volatile	PH
<b>Group 1</b>	2.1	>1500°C (2732°F)	N/A	0	N/A
<b>Group 2</b>	1.5	>1500°C (2732°F)	N/A	<1 wt. % H <sub>2</sub> O	N/A
<b>Group 3</b>	1.5	>1500°C (2732°F)	N/A	28-31 wt. % H <sub>2</sub> O	N/A
<b>Group 4</b>	N/A	>1500°C (2732°F)	N/A	40 wt. % H <sub>2</sub> O	4.5-5
<b>Group 5</b>	0.30	>1200°C (2192°F)	N/A	69 wt. % H <sub>2</sub> O	N/A

## 10. Stability and Reactivity

**Stability:** Materials are stable.

**Chemical Incompatibilities:** Powerful oxidizers; fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, etc.

**Hazardous Decomposition Products:** none.

## 11. Toxicology

**Epidemiology:** N/A

**Toxicology:** N/A

## 12. Ecological Information

**Ecotoxicological Information:** No information available.

**Distribution:** Aluminum oxide and silica are naturally occurring and are widely distributed in igneous rock. Secondary deposits in sedimentary rock may be found.

**Chemical Fate Information:** The relative inertness of this material indicate that it may be highly persistent in the environment. No information regarding any negative effects of this persistence has been noted.

## 13. Disposal Information

**Disposal:** Consult with local, state and federal regulations. In most cases these materials may be landfilled safely.

**Hazardous Waste Classification:** Not listed as a RCRA Hazardous waste (40 CFR 261.31). Not listed under SARA, CERCLA, or the Clean Air Act.

**Empty Containers:** Empty containers may contain product dust or residue. Do not re-use.

**Disposal regulations vary. Consult with all applicable regulations prior to disposal.**

## 14. Transportation Information

Not regulated hazardous substances, no specific regulations apply.

## 15. Regulatory Information

**SARA Section 313 Supplier Notification:** These products do not contain toxic chemicals subject to the reporting

requirements of the superfund and reauthorization act of 1986 section 313 (40 CFR 372).

**WHMIS Status:** Aluminum oxide (CAS no. 1344-28-1), Silica (amorphous) (CAS no.60676-86-0), and Calcium oxide (CAS no. 1305-78-8) are subject to disclosure under the Hazardous Products. Act.

**New Jersey Right to Know Note:** Aluminum oxide (CAS no. 1344-28-1) and Silica (amorphous) (CAS no.60676-86-0), are found on the New Jersey Hazardous Substance list and are subject to reporting under SARA and the New Jersey Worker and Community Right to Know Act.

## 16. Other

The information contained herein is based on data considered to be accurate as of the preparation or revision date. It is provided in good faith and in compliance with state and federal regulations. No warranty or representation, express or implied is made as to the accuracy or completeness of this information. Other national, state and/or local regulations may apply.