MATERIAL SAFETY DATASHEET

MSDS-1
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1. Product Identification

Trade Name:	Alumina Products	Chemical Name:	Mixture
Group 1	Synonym: Fibrous Alumina Ceramic Insulation	Molecular Formula: Al_2O_3, SiO_2	
	Types: AL-15/1600B, AL-25/1700, AL-30, ALC, MB, SALI, SALI-2, ZAL-12, ZAL-15, ZAL-45		
Group 2	Synonym: Fibrous Alumina Ceramic Insulation	Molecular Formula: Al_2O_3, SiO_2	
	Types: AB, AL-30AA, AL-30AAH, ALBF, ALBF-1, ALC-AA, Alumina Mat, APA-2, APA-3, ECO-20AA, HA, ZAL-15AA, ZAL-45AA, ARA-1000		
Group 3	Synonym: Fibrous Alumina Ceramic Insulation	Molecular Formula: Al_2O_3, SiO_2	
	Types: APA-1		
Group 4	Synonym: Alumina Colloid in Water	Molecular Formula: Al_2O_3	
	Types: AL-R/H		
Group 5	Synonym: Alumina Suspension in Water	Molecular Formula: Al_2O_3, SiO_2	
	Types: AL-CEM		
Group 6	Synonym: Bubble	Molecular Formula: Al_2O_3, SiO_2	
	Types: IB-100A, IB-100B		
Group 7	Synonym: Fibrous Alumina Moldable Insulation	Molecular Formula: Al_2O_3,SiO_2	
	Types: SALI-Moldable		
Group 8	Synonym: Aluminum Oxide and Calcium Aluminate Cement	Molecular Formula: Al_2O_3, SiO_2, CaO	
	Types: ZIRALCAST-95, ZIRALCAST-104		
Group 9	Synonym: High Alumina Refractory Adhesive	Molecular Formula: Al_2O_3, SiO_2, K_2O	
	Type: HITAC-4		
Group 10	Synonym: Dense Alumina Refractory	Molecular Formula: Al_2O_3	
	Type: DAHP, HR-1, HR-2, HR-3A		
Group 11	Synonym: Refractory Hardboard	Molecular Formula: Al_2O_3, SiO_2, CaO	
	Type: FRA-600		

2. Composition / Information on Ingredients

Component	Molecular Formula	CAS Number
Alumina	Al_2O_3	1344-28-1
Silica (amorphous)	SiO_2	7631-86-9
Silica (cristobalite)	SiO_2	14464-46-1
Calcium Aluminate Cement	$CaO\ Al_2O_3$	1204268-1
Calcium Oxide	CaO	1305-78-8
Ethyl Acrylate Binder	-	140-88-5
Potassium Silicate Solution	K_2O	1312-76-1, 7732-18-5

Groups from Section One	Components	% by Weight
Groups 1 & 7	Alumina	80-87
	Silica (amorphous)	13-20
Groups 2, 5 & 6	Alumina	95-99
	Silica (amorphous)	1-5
Group 3	Alumina	90
	Silica (amorphous)	5
	Ethyl Acrylate Binder	5
Groups 4 & 10	Alumina	>99
Group 8	Alumina	70 – 100
	Silica (amorphous)	0 – 5
	Calcium Aluminate Cement	0 - 20
Group 9	Alumina	60 – 80
	Silica (amorphous)	10 – 30
	Potassium Silicate Solution	0 - 10
Group 11	Alumina	70 – 82
	Silica (amorphous)	12 – 18
	Calcium Oxide	6 – 7

Exposure Guidelines

Aluminum Oxide	
OSHA PEL as 8 hr TWA	5/15 mg/m^3 Total dust/Respirable Fraction
ACGIH PEL as 8 hr TWA	10 mg/m^3 Inhalable particulate with no asbestos and <1% crystalline silica
Canadian PEL as TWA	5 mg/m^3
Carcinogenicity by ACGIH	Group A4, Not classifiable as a human carcinogen
Silica (amorphous)	
OSHA PEL as 8 hr TWA	20 mppcfa, 80 mg/m^3
NIOSH PEL as 8 hr TWA	6 mg/m^3
Canadian PEL as TWA	2/5 mg/m^3 Total mass/Respirable Mass

ILDH Level by SCPC	3000 mg/m^3
Carcinogenicity by ACGIH	Group 3
Silica (cristobalite)	
OSHA PEL as 8 hr TWA	0.05 mg/m3
ACGIH PEL as 8 hr TWA	0.05 mg/m3
Carcinogenicity by ACGIH	Y
Calcium Aluminate Cement	
OSHA PEL as 8 hr TWA	5.0 mg/m3
ACGIH PEL as 8 hr TWA	5.0 mg/m3
Carcinogenicity by ACGIH	N
Calcium Oxide	
OSHA PEL as 8 hr TWA	5 mg/m^3
ACGIH PEL as 8 hr TWA	2 mg/m^3
Ethyl Acrylate Binder	
OSHA PEL as 8 hr TWA	25 ppm, 100 mg/m^3 (Skin)
ACGIH PEL as 8 hr TWA	5 ppm, 20 mg/m^3
Carcinogenicity by ACGIH	Not Classified

3. Hazard Identification

Emergency Overview

TARGET ORGANS: Skin, eyes, and lungs

CAUTION: Handling or machining of these products may produce respirable dust particles. Dust may irritate eyes, skin respiratory tract.

Inhalation: Dust may cause irritation or soreness of throat and nose.

Eye Contact: Dust may cause temporary irritation or inflammation.

Skin Contact: May cause temporary dryness, irritation or rash.

Ingestion: Ingestion is unlikely. May cause gastrointestinal disturbances. Never induce vomiting without the advice of a physician.

Medical Conditions Aggravated by Exposure: Respiratory effects may be aggravated by smoking. Pre-existing respiratory problems may be aggravated by dust.

The Hazardous Materials Identification System (HMIS)-

Groups from Section One	Health	Flammability	Physical Hazard
Groups 1, 2, 4, 5, 6, 7, 9, 10 and 11	1*	0	0
Group 3	1*	1	1
Group 8	1*	0	1

Note: * denotes potential for chronic effects.

4. First Aid Measures

Inhalation: Remove to fresh air. Rinse mouth to clear throat and expel liquid. Blow nose to evacuate dust. Dust from group 8 products should not be inhaled as it may cause permanent lung injury (silicosis). Consult a physician if irritation persists.

Eye Contact: Products can be physical irritants to eyes. 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: Products are irritants. 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: Drink plenty of water. 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.

Many of 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.

Products in group 8 contain crystaline silica (cristobalite). The (IARC) has classified crystalline silica inhaled in the form of quartz or cristobalite carcinogenic to humans.

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 products (groups 3 & 4) 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 in a dry place indefinitely. Physical abrasion may produce small amounts of respirable dusts. Liquid and moist products (groups 4, 5, 7) 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:. 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. . See section 8 for appropriate respiratory protection during removal.

8. Exposure Controls

Engineering Controls:	Use dust suppression controls. Local exhaust ventilation, point of generation dust collection, and/or down-draft work stations to minimize airborne dust generation are recommended when machining product.
Respiratory Protection:	Use appropriate protection pursuant to OSHA 29CFR 1910.134 and 29CFR 1926.103. The following information is provided as a guide and reflects industry recommendations for control of dust.
PPE < 1.0 f/cc	No specific recommendation, use personal protective equipment based on local conditions.
PPE 1.0 f/cc to 5.0 f/cc	Half-face, air purifying respirator equipped with a high efficiency particulate air (HEPA) filter cartridge.
PPE 5.0 to 25 f/cc	Full-facepiece, air purifying respirator equipped with a high-efficiency particulate air (HEPA) filter cartridge
PPE > 25 f/cc	Full-facepiece, positive pressure, supplied air respirator.
PPE Other	Work clothes should be washed separately and the washing machine rinsed following use. If possible, do not take work clothes home following machining or removal activities that produce significant amounts of dust.
Skin Protection	Wear gloves, head coverings, and full body clothing to prevent skin irritation. Disposable clothing may be used. Store work clothes and street clothes separately.
Eye Protection	Wear safety glasses or chemical goggles to prevent eye contact. Do not wear contact lenses without goggles. Do not get dust or liquids into eyes. Have eye washing facilities available when using products.
Products in groups 1 through 7 are generally not hazardous during normal use. These guidelines are provided for special circumstances involved in machining , use and or after service removals. Products in group 8 contain crystobalite which the IARC has classified as carcinogenic to humans. Hydrogen gas could be generated when (group 8) products are mixed with water. Avoid use of closed forms. Proper ventilation is recommended. See section 7 for after service and section 13 for disposal recommendations.	

9. Physical/Chemical Properties

	Form	Appearance	Odor	Solubility in H_2O
Groups 1 and 2	Fibrous materials in rigid shapes, papers, blankets, and bulk fibers, with inorganic bond or organic-free	White	Odorless	Insoluble

Group 3	Fibrous materials in rigid shapes, and papers, with organic bond	White to Tan	Odorless	Insoluble
Group 4	Liquid	Light green with white solids which settle upon standing	Slightly acidic	Insoluble
Group 5	Viscous liquid	White	Slightly acidic	Insoluble after drying
Group 6	Hollow spheres	Off white , white	Odorless	Insoluble
Group 7	Moist fibrous lumpy paste	Light green	Slightly acidic	Insoluble
Group 8	Dry mixture of cement and alumina spheres	White	Odorless	Insoluble
Group 9	Liquid	White	Odorless	Insoluble after drying
Group 10	Dense ceramic in rigid shapes	White	Odorless	Insoluble
Group 11	Rigid shapes	White to tan	Odorless	Insoluble

	S. G.	Melting Point	Vapor Pressure	% Volatile	PH
Groups 1, 2, and 6	N/A	>1871^{o}C (3400^{o}F)	N/A	0	N/A
Group 3	N/A	>1871^{o}C (3400^{o}F)	N/A	5 wt. % H_2O	N/A
Group 4	1.18	>2038^{o}C (3700^{o}F), dried	N/A	71 wt. % H_2O	4.2
Group 5	1.95	>1871^{o}C (3400^{o}F), dried	N/A	28 wt. % H_2O	5
Group 7	N/A	>1871^{o}C (3400^{o}F)	N/A	15 wt. % H_2O	6.5
Group 8	3.16	>1925^{o}C (3500^{o}F),	N/A	0 wt. % H_2O	N/A
Group 9	1.8	>1871^{o}C (3400^{o}F) dried	N/A	35 wt. % H_2O	10
Group 10	3.9	~2000^{o}C (3632^{o}F)	N/A	0	N/A
Group 11	2.1	>1500^{o}C (2732^{o}F)	N/A	0	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 these material indicate that they 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 land filled safely.

Hazardous Waste Classification: Subject to SARA Title III Notification.

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

Regulated Constituent: Aluminum Oxide, Silica (amorphous)

SARA Title III Constituent: listed none

SARA de Minimus Concentration: 1.0% N/A

N.J. Right to Know: listed none

Penn. Right to Know: listed none

Mass. Right to Know: listed none

SARA Note: The listed substance requires reporting under Section 313 of SARA Title III of the Emergency Planning and Community Right to Know Act, annually if above the de Minimus Concentration and threshold quantity.

New Jersey Right to Know Note: The listed substance is found on the New Jersey Hazardous substance list and is subject to reporting under SARA and the New Jersey Worker and Community Right to Know Act.

Pennsylvania Right to Know Note: The listed substance is subject to reporting under the Commonwealth of Pennsylvania’s Worker and Community Right to Know Act. Form HSSF submissions due annually on April1.

Mass. Right to Know Note: Items on the Massachusetts List of Hazardous Substances require specific hazard labeling in the workplace.

WHMIS Status: This is a class D2 controlled product based on an IARC 2B classification for ceramic fibers. Aluminum oxide (CAS no. 1344-28-1) and silica (amorphous) (CAS no. 7631-86-9) are subject to disclosure under the Hazardous Products Act.

California Proposition 65: On July 1, 1990 the state of California added "ceramic fibers (airborne particles of respirable size)" to the list of Proposition 65 chemicals which are "known to cause cancer" by the state. Proposition 65 lists all substances classified by the IARC as a Category 1, 2A or 2B carcinogen. As products in group 9 contain crystaline silica they too are known by the state of California to cause cancer.

Regulated Constituent: Ethyl Acrylate Binder

Decomposition by burning. Hazardous gases: CO, CO2, Small amounts of aromatic and aliphatic hydrocarbons.

The levels of the above gases will vary with combustion conditions, oxygen level and heat.

In unventilated areas, proper respiratory protection should be used.

Decomposition by heat in a starved oxygen atmosphere.

Hazardous gases released: Acrylate monomer, Acrylonitril monomer

Acrylates: Detected by odor at approximately 90 ppb. The recommended exposure should be controlled at or below 5 ppm as an 8 hr. TWA.

Acrylonitriles: At the levels of latex add on and the small amount in the latex polymer as received, there may be trace amounts released under extreme conditions.

Special Precautions:

A. After Service Information: After normal use at elevated temperatures, alumina and amorphous silica will react to form non-hazardous mullite and alpha alumina. After crystalline silica is exposed to temperatures above 1600F (870C) cristobalite and tridymite are formed. Compliance with all guidelines for crystalline silica is required. Removal of these products may generate respirable dust and airborne ceramic fibers.
B. SARA Section 313 Supplier Notification: This product contains the following toxic chemicals subject to the reporting requirements of the Superfund Amendments and Reauthorization Act of 1986 Section 313 (40 CFR 372): Aluminum oxide (fibrous) (CAS no. 1344-28-1).
C. Before Service Information: Group 3: Organic binder will burn off during first heat up. Acrid smoke and irritating fumes may be released. Typical combustion products are carbon, carbon monoxide, and carbon dioxide. Appropriate exhaust and ventilation should be used.
D. If confined, limited air space and ventilation conditions exist, in-plant monitoring should be done to insure compliance.

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.