



MATERIAL SAFETY DATA SHEET

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1. PRODUCT NAME AND COMPANY IDENTIFICATION

MANUFACTURER:

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PRODUCT(S): AL-90, Alumina Brick
DATE: January 1st, 2014
MSDS No.: 6102007
REVISION No.: 1

2. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>Weight %</u>	<u>CAS Number</u>	<u>'96 ACGIH TLV</u>	<u>OSHA PEL</u>
Silica, crystalline cristobalite	<5	14464-46-1	0.05 mg/m ³	0.05 mg/m ³
Alumina (non-fibrous)	<10	1344-28-1	10 mg/m ³	5 mg/m ³
Alumino-silicates	>85	66402-68-4	NE	NE

At very high temperatures such as during refractory use, other/additional forms of silica (such as quartz, cristobalite, tridymite, amorphous) may be formed, triggering other applicable exposure guidelines. In addition, refractory may become contaminated with other hazardous substances (e.g., metals, alkaline materials). The specific processing and use of this refractory should be fully evaluated to assess the entire scope of health hazards.

Note: 1) TLV and PEL values given above are 8-hour, time-weighted averages, unless otherwise specified.

2) NE = None Established, and means that the substance is not assigned a specific TLV or PEL. Substance regulated by OSHA as particulates not otherwise regulated (PNOR, PELs - 15 mg/m³ total dust, 5 mg/m³ respiratory fraction) and by ACGIH as particulates not otherwise classified (PNOC, TLV - 10 mg/m³ total dust, 3 mg/m³ respirable fraction) and is considered a nuisance dust.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW : Solid brick or other form, practically odorless. As-manufactured product does not pose significant fire or health hazards. Refractory particulates formed during processing, installation, maintenance procedures and/or tear-out may be irritating to the skin, eyes and respiratory tract, and may cause pulmonary system effects. Potential for cancer and silicosis exists for long-term exposures to product particulates. Product is noncombustible and stable.

PRIMARY ROUTES OF ENTRY : **Inhalation:** Yes. **Skin:** No. **Ingestion:** No. **Other:** No.

EYE CONTACT : Particulates may cause slight to moderate irritation. Abrasive action of dust can damage eyes.

SKIN CONTACT : Particulates may cause slight irritation.

INHALATION : Inhalation of airborne particulates may cause slight to moderate irritation of mucous membranes.

INGESTION : Ingestion is unlikely. If ingested in sufficient quantities, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain and diarrhea.

CHRONIC : The prolonged inhalation of dusts containing crystalline silica may result in the development of disabling pulmonary fibrosis known as silicosis. Silicosis is a chronic disease characterized by generalized fibrotic changes and the development of nodules in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis, and characteristic x-ray findings.

CARCINOGENICITY : IARC has listed crystalline silica from occupational sources as a Group 1 carcinogen. A Group 1 carcinogen is one in which there is sufficient evidence for carcinogenicity in humans. NTP has listed crystalline silica as reasonably anticipated to be a carcinogen.

SIGNS AND SYMPTOMS OF OVEREXPOSURE: Irritation, shortness of breath, decreased chest expansion, dry cough, fatigue, dyspnea, cyanosis, loss of appetite, chest pain, total incapacity to work.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE (to particulates): Preexisting diseases or other conditions of the lungs, skin, eyes, and other mucous membranes. Exposure to product dust in conjunction with exposure to other potential carcinogens (such as cigarette smoking) may have a synergistic effect.

4. FIRST AID MEASURES

INHALATION : Immediately remove victim from the adverse environment to fresh air and seek medical attention.

EYE CONTACT : Immediately flush with large amounts of running water as needed. If symptoms persist, seek medical attention.

SKIN CONTACT : If dust gets on skin, wash contaminated area with soap and water. Remove and wash contaminated clothing. If rash, irritation, or other symptoms persist, seek medical attention.

INGESTION : Ingestion is an unlikely route of exposure. If particles are ingested and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting for a doctor, since particles may be aspirated into the lungs. Seek immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable. **FLASH POINT METHOD USED :** Not applicable.

FLAMMABLE LIMITS : Not applicable. **LEL :** Not applicable. **UEL :** Not applicable.

AUTOIGNITION : Not applicable.

GENERAL HAZARD : This refractory product is noncombustible and does not pose fire or explosion hazards, and will not ignite or contribute to the intensity of a fire.

EXTINGUISHING MEDIA : As appropriate for surrounding fire.

FIRE FIGHTING INSTRUCTIONS : As appropriate for surrounding fire.

FIRE FIGHTING EQUIPMENT : As appropriate for surrounding fire. Generally, fire fighters should wear full turn-out (bunker) gear and full respiratory protection (self-contained breathing apparatus-SCBA). Wear SCBA with full facepiece, operated in the positive pressure mode when fighting fires.

HAZARDOUS COMBUSTION PRODUCTS : Not applicable.

UNUSUAL FIRE AND EXPLOSION HAZARDS : Not applicable.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: If there is a spill of product, installation, maintenance, or tear-out material, the following precautions should be taken: Clean up using methods which avoid dust generation. If a vacuum is used, exhaust air should be filtered by a high-efficiency particulate air (HEPA) filter. Compressed air should not be used to clean up spills. During cleanup, skin and eye contact and inhalation of dust should be avoided. Provide local exhaust or dilution ventilation as required. When necessary, wear appropriate personal protective

equipment (see Section 8) during clean-up operations. Collect material in a compatible and appropriately labeled container. For small dry spills, place material into clean dry container with a clean shovel, and cover. Comply with federal, state, and local regulations regarding reporting of spills. Dispose of material from processing, installation, maintenance, or tear-out operations in accordance with applicable federal, state, and local regulations (see Section 13).

7. HANDLING AND STORAGE

STORAGE TEMPERATURE AND PRESSURE: Not applicable.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE : Store in a dry area. Minimize dust generation and avoid inhalation and contact with dusts during processing, installation, maintenance, and/or tear-out. After handling of dusts from processing, installation, maintenance, and/or tear-out, wash exposed skin areas thoroughly. Wash clothing contaminated with dusts.

8. EXPOSURE CONTROL AND PERSONAL PROTECTION

NOTE : Dusts generated during maintenance and tear-out operations may be contaminated with other hazardous substances (e.g., metals, alkali materials). Evaluation of specific processes should be performed by a qualified health and safety professional to determine appropriate controls and personal protective equipment to minimize exposure and contact.

RESPIRATORY PROTECTION: Use an appropriate NIOSH/MSHA-approved respirator if airborne contaminant concentrations exceed applicable OSHA PEL or ACGIH TLV limits (see Section 2 for PELs and TLVs) or other industry standards or guidelines on exposure. If respiratory protection is required, all appropriate requirements as set forth in 29 CFR 1910.134 must be met. A qualified health and safety professional should be consulted for respirator selection.

PROTECTIVE GLOVES: Use as needed to prevent skin contact.

EYE PROTECTION: Use safety glasses and/or dust-proof safety goggles to prevent contact with dust.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Clothing which minimizes skin exposure.

ENGINEERING CONTROLS : Use local and/or general dilution ventilation, as needed, to reduce employee exposures to below applicable OSHA PELs and ACGIH TLVs (see Section 2 for PELs and TLVs).

WORK/HYGIENE PRACTICES : Use good personal hygiene when handling this product. Wash hands after use, before smoking, or before using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT :	Not applicable.	APPEARANCE :	Solid.
MELTING POINT :	>2000°F	ODOR :	None.
FREEZING POINT :	Not applicable.	pH :	Not applicable.
VAPOR PRESSURE :	Not applicable.	SPECIFIC GRAVITY :	2.0 - 3.0
VAPOR DENSITY :	Not applicable.	SOLUBILITY IN WATER :	Insoluble.
MOLECULAR WT. :	Not applicable.	POUNDS PER GALLON :	Not applicable.
% VOLATILES :	Not applicable.	EVAPORATION RATE :	Not applicable.

10. STABILITY AND REACTIVITY

STABILITY: Stable. **CONDITIONS TO AVOID :** Not applicable.

HAZARDOUS POLYMERIZATION : Will not occur. **CONDITIONS TO AVOID :** Not applicable.

INCOMPATIBILITY : Strong acids and strong alkalis may attack product.

HAZARDOUS DECOMPOSITION : Not applicable.

11. TOXICOLOGICAL INFORMATION

For aluminosilicates: The toxic dose threshold (TD_{Lo}) for the rat was reported as 90 mg/kg, by the intrapleural route. Tumorigenic effects on the respiratory system were noted.

For crystalline silica: The human lethal airborne concentration threshold (LC_{Lo}) was reported as 400 particles per cubic centimeter with intermittent exposure over 4 years. Fibrosis of the lungs was noted as the toxic effect. In another study, the human lethal airborne concentration threshold was reported as 16 mppcf with intermittent 8-hour exposures over 17.9 years. Toxic effects noted were fibrosis, cough, and dyspnea. The toxic dose threshold (TD_{Lo}) for the rat was reported as 90 mg/kg, by the intrapleural route. Tumorigenic effects noted were lymphoma including Hodgkin's disease. When administered as a single intrapleural injection, cristobalite or tridymite, with particles in the respirable range, induced malignant lymphomas in rats of both sexes.

12. ECOLOGICAL INFORMATION

Dusts of as-manufactured refractory product have a low order of aquatic toxicity (rating TLm96: over 1000 ppm), are insoluble, and are not very mobile. Based upon this information, it is not believed to be a significant threat to the environment if accidentally released on land or into water. However, dust and material generated during maintenance and tear-out operations may be contaminated with other hazardous substances (e.g., metals, alkaline materials). Evaluation of dust and material from specific processes should be performed by a qualified environmental professional to determine if an environmental threat exists in the case of a release.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: The as-manufactured refractory or refractory dust is not considered a hazardous waste as defined by 40 CFR 261. However, dust and material generated during maintenance and tear-out operations may be contaminated with other hazardous substances (e.g., metals, alkaline materials). Therefore, appropriate waste analysis may be necessary to determine proper disposal. Waste characterization and disposal/treatment methods should be determined by a qualified environmental professional in accordance with applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

DOT Proper Shipping Name (49 CFR 172.101) :	Not applicable.
DOT Hazard Class (49 CFR 172.101) :	Not applicable.
UN/NA Code (49 CFR 172.101) :	Not applicable.
DOT Labels Required (49 CFR 172.101) :	Not applicable.
DOT Placards Required (49 CFR 172.504) :	Not applicable.

15. REGULATORY INFORMATION

CAA Title VI : This product does not contain nor was it manufactured using ozone-depleting chemicals.

TSCA Status: All components used in this product are on the Toxic Substances Control Act Inventory.

CERCLA Hazardous Substances : None.

SARA Title III :

Section 302 Extremely Hazardous Substances : None.

Section 311/312 Hazardous Categories : Immediate (Acute).

Section 313 Toxic Chemicals : None.

RCRA Status : Not regulated.

California Proposition 65 : The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) requires that the Governor of California publish a list of chemicals known to the State to cause cancer or reproductive harm.

Silica is on the Governor's Proposition 65 list.

Components used in this product may contain minor trace amounts of inherent naturally occurring elements (such as, but not limited to, arsenic, cadmium) that are on the Governor's Proposition 65 list.

INTERNATIONAL:

IARC : IARC has listed respirable crystalline silica from occupational sources as a Group 1 carcinogen.

CANADA (WHMIS) : All components used in this product are listed on the Domestic Substances List (DSL)

EUROPEAN COMMUNITY : All components used in this product are listed on ECOIN, the European Core Inventory.

AUSTRALIA : All components used in this product are listed on the AICS inventory.

JAPAN : Silicon is listed on MITI, the Ministry of International Trade Industry.

16. OTHER INFORMATION

DESCRIPTION : This product is a solid refractory shape.

NFPA RATING : **FLAMMABILITY :** 0 **TOXICITY :** 1 **REACTIVITY :** 0

HMS RATING : **FLAMMABILITY :** 0 **HEALTH :** 1 **REACTIVITY :** 0

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REFERENCES:

Lewis, R. J., *Hawley's Condensed Chemical Dictionary*, Twelfth Edition, Van Nostrand Reinhold Co., Inc., NY.

Material Safety Data Sheets-Preparation, ANSI Z400.1-1993, American National Standards Institute, NY.

Threshold Limit Values and Biological Exposure Indices for Chemical Substances and Physical Agents, ACGIH, OH.

Sax, N. I., *Dangerous Properties of Industrial Materials*, Ninth Edition, Van Nostrand Reinhold Co., Inc., NY.

Manufacturers/Suppliers Material Safety Data Sheets on raw materials used.

LEGEND

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
ECOIN	European Core Inventory
EPA	Environmental Protection Agency
IARC	International Agency for Research on Cancer
LC ₅₀	Lethal concentration (50% kill)
LC _{Lo}	Lowest published lethal concentration
LD ₅₀	Lethal dose (50% kill)
LD _{Lo}	Lowest published lethal dose
MSHA	Mine Safety and Health Administration
NE	None established
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PIN	Product Identification Number
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TD _{Lo}	Lowest published toxic dose
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Material Information System (Canada)