MATERIAL SAFETY DATA SHEET
FOR
HIGH HEAT DUTY

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: High Heat Duty
Chemical Name: Inorganic Oxide

Company Name: **Mt. Savage Firebrick**
17901 Mt. Savage Rd NW
Frostburg, MD 21532 USA
Company Phone: 301-689-1788
MSDS No.: MS0035
Date Prepared: 03/12/2008
Revision Date: **N/A**

SECTION 2. COMPOSITION OF REFRACTORY SHAPE

This product is a fired refractory shape/brick (an article) available in various sizes and shapes. It is composed of the following mineral phases some of which may be present in dust generated by sawing, cutting, or crushing during installation or tear- out.

Ingredient Name	CAS Number	Percent	IARC NTP OSHA	Exposure Limits
Clay	1332-58-7	50-75	No	OSHA PEL:TWA for mineral dust containing SiO_2, respirable:10mg/m^3 divided by (%SiO_2 +2).
Quartz (SiO_2)	14808-60-7	15-25	Yes	ACGIH TLV:TWA respirable quartz 0.05mg/m^3. OSHA PEL:TWA total 0mg/m^3÷(%SiO_2+2); respirable 10mg/m^3÷(%SiO_2+2).
Aluminosilicate	1302-93-8	10-20	No	Nuisance Particulate Not Otherwise Regulated. OSHA PEL:TWA total dust: 15mg/m^3; respirable dust: 5mg/m^3. ACGIH TLV:TWA total dust: 10mg/m^3; respirable dust: 5mg/m^3.
Cristobalite (SiO_2)	14464-46-1	1-3	Yes	ACGIH TLV:TWA respirable 0.05mg/m^3. OSHA PEL:TWA total 30 mg/m^3÷ 2(%SiO_2+2); respirable 10 mg/m^3÷2(%SiO_2+2).
Silica, Fused	60676-86-0	1-3	No*	ACGIH TLV:TWA respirable 0.10 mg/m^3. OSHA PEL:TWA 80 mg/m^3 ÷ %SiO_2.

Quartz and cristobalite, polymorphs of crystalline silica, classified by IARC as "Known Human Carcinogens - Group 1". NTP lists respirable crystalline silica amongst substances which may "reasonably be anticipated to be carcinogens".
***Silica, fused.** ACGIH states this substance has been identified by sources other than IARC, NTP, or OSHA as a suspected or confirmed human carcinogen.

SECTION 3. HAZARDS IDENTIFICATION

HMIS

HEALTH HAZARD	1 - SLIGHT
FLAMMABILITY HAZARD	0 - MINIMAL
REACTIVITY HAZARD	0 - MINIMAL
PERSONAL PROTECTION	B – Glasses, Gloves

EMERGENCY OVERVIEW: The product is a tan/brown, fired refractory shape/brick ready for installation. Slight health risk from inhalation of dust generated during installation(sawing/crushing). Not a fire, spill or environmental hazard.
Target organs: Upper Respiratory System
Primary route(s) of entry: Inhalation

(HAZARD IDENTIFICATION continues on page 3)

ACUTE EFFECTS

Eye contact: Dust particulate is a physical irritant.
Skin contact: Physical abrasion.
Inhalation: Inhalation of airborne particulate from sawing or crushing may irritate upper respiratory system.
Ingestion: An unlikely route of exposure. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms will include irritation and may include nausea, vomiting and abdominal pain.

CHRONIC EFFECTS

Dust which may be generated from sawing, or crushing product during installation and from after service tear-out may contain free/crystalline silica. The prolonged inhalation (usually years) of mineral dusts containing free/crystalline silica may result in the development of a disabling pulmonary fibrosis known as silicosis; a progressive, incapacitating and sometimes fatal lung disease. IARC has classified crystalline silica as a "Known Human Carcinogen - Group 1". NTP lists respirable crystalline silica amongst substances which may "reasonably be anticipated to be carcinogens". See Section 16 for safe "Removal After Service Precautions".

SECTION 4. FIRST AID MEASURES

Eye contact: Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.
Skin contact: Wash affected areas with mild soap and water.
Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.
Ingestion: Ingestion is an unlikely route of exposure. If ingested in sufficient quantity 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 to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

SECTION 5. FIRE FIGHTING MEASURES

NFPA code: Flammability: 0 , **Health:** 0 , **Reactivity:** 0 , **Special:** 0 .
Flash point: Not Combustible
Hazardous Decomposition Products: None
Extinguishing media: No special instructions or conditions.
Firefighting instructions: Firefighters should wear NIOSH-approved, positive pressure, self-contained breathing apparatus and full protective clothing where appropriate.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill procedures: Product is not a spill nor environmental hazard.

SECTION 7. HANDLING AND STORAGE

Storage: No special storage instructions.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering controls: Provide sufficient ventilation, in both volume and air flow patterns, to control dust concentrations below allowable exposure limits.
Personal protective equipment: The use of eye protection, gloves and long sleeve clothing is recommended.
Respiration protection: Provide workers with NIOSH approved respirators in accordance with requirements of 29 CFR 1910.134 for level of exposure incurred.
Hygienic Practices: Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating or drinking.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: These fired refractory shapes are brown to tan in color and available in various sizes and shapes; odorless.
Boiling Point: Not Applicable
Specific Gravity(g/cc): Mixture
Melting Point: >2900°F (<1590°C)
Bulk Density(g/cc): 2.18
Water Solubility: 0
% Volatile by volume: 0
Ph (10% aqueous slurry): Not Applicable
Evaporation rate: Not applicable

SECTION 10. STABILITY AND REACTIVITY

Hazardous Polymerization: Will not occur
Chemical Incompatibilities: None
Hazardous Decomposition Products: None

SECTION 11. TOXICOLOGICAL INFORMATION

1. *Clay* (Aluminosilicate) Toxic and Hazard Review Chemical Toxicology (Hodge Et al.) Clay see silica. Toxicity Rating: 1. Chemically and biologically inert when ingested in any of its many physical forms, such as crystalline quartz, amorphous siliceous earth or colloidal silica gels.
2. *Quartz* CAS# 14808-60-7. Toxic and Hazard Review (Sax): Experimental poison by intratracheal and intravenous routes. Anexperimental carcinogen, tumorigen, and neoplastigen. CLASS OF COMPOUND(RTECS): Tumorigen; Mutagen; Human data. Human systemic effects by inhalation: cough, dyspnea, liver effects. Listed by IARC as a "known human carcinogen" Group 1. Listed by NTP. No LD_{50} in RTECS.
   Toxicity Data: Inhalation human: TCLo 16 million particles per cubic centimeter per 8 hours per 17.9 Years-Intermittent: Pulmonary system effects; Inhalation-human LCLo: 300 micrograms/m^3 per 10 years-intermittent: liver.
   Other species toxicity data (NIOSH RTECS): intravenous-rat LDLo: 90 mg/kg; intraperitoneal-rat LDLo: 200 mg/kg; intravenous-mouse LDLo: 40 mg/kg; intravenous-dog LDLo: 20 mg/kg.

3. *Aluminum Silicates* Toxic and Hazard Review (Sax): an experimental tumorigen by implant. Toxicity Data: ipl-rat TDLo:90 mg/kg: ETA
4. *Cristobalite* CAS#14464-46-1 Toxic and Hazard Review (Sax): Poison by intratracheal route. An experimental carcinogen and tumorigen. Human systemic effects by inhalation: cough, dyspnea, fibrosis. Listed by IARC as a "Known Human Carcinogen - Group 1". Listed by NTP. No LD_{50} in RTECS. Inhalation-human TCLo: 400 particles per cubic centimeter per 4 years-intermittent: Pulmonary system effects. Other species toxicity data (NIOSH RTECS 1992): intratracheal-rat LDLo 200 mg/kg; intrapleural-rat TDLo: 90 mg/kg: carcinogenic effects; intrapleural-rat TD: 100 mg/kg: equivocal tumorigenic agent; intratracheal-rat LDLo: 200 mg/kg.
5. *Fused silica* CAS#60676-86-0 Toxic and Hazard Review (Sax): Poison by intraperitoneal, intravenous and intratracheal routes. IARC Cancer Review: Animal sufficient Evidence. ACGIH states (3/93) that this substance has been identified by other sources as a suspected or confirmed human carcinogen. No LD_{50} in RTECS.
   Other species toxicity data (NIOSH RTECS 1992): intraperitoneal-rat LDLo: 400 mg/kg; intratracheal-rat LDLo 120 mg/kg, intraperitoneal-mouse LDLo: 40 mg/kg, intravenous-cat LDLo 15 mg/kg.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicological/Chemical Fate Information: No data available on any adverse effects of this material on the environment.

SECTION 13. DISPOSAL INFORMATION

Waste Management/Disposal: This block, or fragments of such, does not exhibit any characteristics of a hazardous waste and is suitable for landfill disposal. However, debris generated during installation or tear-out procedures may be contaminated with other hazardous materials. Therefore, appropriate waste analysis in these instances may be necessary to determine proper method of disposal. Waste characterization and disposal/treatment methods should be determined by a qualified environmental professional in accordance with applicable federal, state and local regulations.

SECTION 14. TRANSPORT INFORMATION

US Department of Transportation: Not regulated by DOT as a hazardous material. No hazard class, no label or placard required, no UN or NA number assigned.
Canadian TDG Hazard Class & PIN: Not regulated

SECTION 15. REGULATORY INFORMATION

Product or components of mixture regulated under following lists:
SARA TITLE III:
Section 302: No (Extremely Hazardous Substances)
Section 304: No (Emergency Release)
Section 311: Yes, Cutting/Crushing Product may produce hazardous products - MSDS
Section 312: No, Tier I/II
Section 313: No (Toxic Chemicals, Toxic Chemical Release Reporting, Form R)

CERCLA Hazardous Substance List, RQ: No
TSCA: All substances in this product are listed in the Chemical Substance Inventory of the Toxic Substances Control Act.
California Proposition 65: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive toxins.

SECTION 16. OTHER INFORMATION

REMOVAL AFTER SERVICE/TEAR-OUT PRECAUTIONS: Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. The following precautions should be taken during tear-out.

1. Employees should be apprised of the hazards and proper conditions and precautions for safe use or exposure.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing respirable crystalline silica, the following warning should be posted.

FREE SILICA WORK AREA	AVOID BREATHING DUST
DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS)	

ACRONYMS AND REFERENCES USED IN PREPARATION OF MSDS'
ACGIH: American Conference of Governmental Industrial Hygienists
CAS#: CAS Registration Number is an assigned number to identify a specific substance. CAS stands for Chemical Abstracts Service.
CERCLA: Comprehensive Environmental Response, Compensation & Liability Act
EPCRA: Emergency Planning and Community Right-to-Know Act of 1986
HMIS™: Hazardous Materials Identification System (National Paint & Coatings Association)
IARC: International Agency for Research on Cancer
MSHA: Mine Safety and Health Administration
mg/m^3: Milligrams per cubic meter
NIOSH: National Institute for Occupational Safety and Health
NFPA: National Fire Protection Association
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit (OSHA)
REL: Recommended Exposure Limit (NIOSH)
SARA: Superfund Amendments and Reauthorization Act
TITLE III: Emergency Planning and Community Right To Know Act
Section 302: Extremely Hazardous Substances
Section 304: Emergency Release
Section 311: *Community Right-to-Know*, MSDSs or List of Chemicals
Section 312: *Community Right-to-Know*, Inventories & Locations, (Tier I/II)
Section 313: Toxic Chemicals, Toxic Chemical Release Reporting, Form R
TLV: Threshold Limit Values (ACGIH)

TWA: Time Weighted Average
29CFR1910.134: OSHA Respiratory Protection Standard

REFERENCES

Sax, N. Irving: Dangerous Properties of Industrial Materials, Ninth Edition, Van Nostrand Reinhold Co., Inc., 1996.
Kirk, R. and Othmer, D., Encyclopedia of Chemical Technology, Third Edition, Wiley-Interscience, New York, NY 1982.
Clansky, K.B., Suspect Chemicals Sourcebook, 1992-2 Edition, Roytech Publications, Bethesda, Maryland.
Sax, N.Irving and Lewis, R.J. Hawley's Condensed Chemical Dictionary, Eleventh Ed., Van Nostrand Reinhold Co.,Inc., NY
Manufacturers/Suppliers, Material Safety Data Sheets on Raw Materials Used
American National Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation, American National Standards Institute, Inc.11 West 42nd St, New York, NY 10036.

Prepared/Revised by: M.E. Jacobs, March 12, 2007