

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT NAME

Date Prepared: May 1, 1987
Date Revised: August 25, 1994

Material Name: **Refractory Ceramic Fiber Product**
Common Name: Refractory Cements, Coatings, and Insulation
Intended Use: High Temperature Insulation
Trade Names: Kaowool Cement A: Kaowool Cement B: FireMaster Putty:
Cera-Kote: Kaowool Moldable: Kaowool Moldable SV:
Kaowool Pumpable XT: Kaowool XTP-HT: Mix 285-H:
Pyro-Log HS: Pyro-Bloc HS:

Manufacturer/Supplier

THERMAL CERAMICS INC.

P.O. BOX 923 DEPT. 300

AUGUSTA, GA 30903

Product Stewardship Program 800-722-5681

SECTION II - COMPOSITION AND INGREDIENTS

	CAS NUMBER:	PERCENT:	OSHA PEL:	OSHA PEL: (PROPOSED)	THERMAL CERAMICS:
Refractory Ceramic Fiber (RCF)	142844-00-6	20 to 60	15mg/m3 (Total dust) 5mg/m3 (Respirable dust)	1 fiber/cc*	1 fiber/cc**
Aluminum Oxide (RAF)	1344-28-1	0-30	10mg/m3 (Total dust) 5mg/m3 (Respirable dust)		1 fiber/cc
Silica, Amorphous	7631-86-9	0-30	10mg/m3 (Total dust) 5mg/m3 (Respirable dust)		
Ethylene Glycol	107-21-1	1 to 10	50ppm (Ceiling level)		

*OSHA proposed permissible exposure limit (PEL) in a *Notice of Proposed Rulemaking, Federal Register* H.S. 1178. June 12, 1992.

**Thermal Ceramics' recommended exposure guideline (REG) for respirable fibers as an 8 hour time weighted average (TWA) exposure, based on air samples collected and analyzed using NIOSH method

7400(B). Use NIOSH method 0500 for total dust and method 0600 for respirable dust collection and analysis.

(NOTE: See Section 8 of this MSDS for Personal Protection Guidelines)

SECTION III - HAZARDS IDENTIFICATION

*Medical conditions
which may be aggravated
by contact:*

This product is sold in a liquid form and in normal applications and use will not present an exposure risk. However, once this product has dried and is abraded or disturbed, dust may be created. Dust and respirable fibers from this product may aggravate existing chronic lung conditions such as bronchitis, emphysema, and asthma. Exposure to burn-off fumes may cause respiratory tract irritation, bronchial hyper-reactivity and asthmatic response. This product contains minor amounts of ethylene glycol which may cause kidney damage - also brain, liver, spleen, lung and blood changes. However, it poses virtually no exposure risk at room temperature because of its low vapor pressure.

Target Organs: Eyes, Skin, and Respiratory system

Primary entry route: Inhalation

Chronic Effects: The International Agency for Research on Cancer (IARC), an arm of the World Health Organization (WHO), has classified RCF, along with fibrous glasswool and mineral wool as possible human carcinogens (Group 2B) based on sufficient evidence of carcinogenicity in animals but insufficient data in humans. Additionally, IARC classified crystalline silica, which may be found in after-service RCF exposed to 1800deg F, as probably carcinogenic to humans (Group 2A).

*Signs and symptoms
of overexposure:*

Eye Contact:	Physical Irritation - Inflammation
Skin Contact:	Physical Irritation - Rash
Ingestion:	May cause temporary irritation to the gastro-intestinal tract
Inhalation:	Irritation or soreness in throat, nose and respiratory tract

SECTION IV - FIRST AID

Eye Contact: Flush with large amounts of water for at least 15 minutes. Do not rub eyes.

Skin Contact: Wash affected area gently with soap and water. Skin cream or lotion after washing may be helpful.

Ingestion: Do not induce vomiting, drink plenty of water.

Inhalation: Remove to clean fresh air.

****If any of the symptoms persist, seek medical attention immediately****

SECTION V - FIRE FIGHTING MEASURES

<i>Flash Point:</i>	Non-combustible
<i>Extinguishing Media:</i>	Use extinguishing media appropriate to the surrounding fire.
<i>Explosion Hazards:</i>	None
<i>Fire Fighting Protective Equipment:</i>	Wear full bunker gear including positive pressure self-contained breathing apparatus.

SECTION VI - ACCIDENTAL RELEASE MEASURES

<i>Spill/Leak Procedures:</i>	Avoid creating dust. Follow routine housekeeping procedures. Vacuum only with HEPA filtered equipment. If sweeping is necessary use a dust suppressant and place material into closed containers. Do not use compressed air. Personnel should wear gloves, goggles, and approved respirator. Avoid clean-up procedures that could result in water pollution.
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SECTION VII - HANDLING AND STORAGE

This product is stable under all conditions of storage. Store in original factory container in a dry area. Keep container closed when not in use. Follow all MSDS/label precautions.

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

<i>Engineering Controls:</i>	Provide adequate ventilation upon first heat to product. Use engineering controls such as ventilation and dust collection devices to reduce airborne fiber concentrations to the lower attainable level.
<i>Protective Clothing:</i>	Protective gloves, long sleeved shirts and pants are recommended. Wash exposed clothing separately from other clothing and rinse washer thoroughly. Vacuum work clothing with HEPA filtered vacuum before removing from the work area.
<i>Eye Protection:</i>	Goggles/safety glasses with sideshields should be worn.
<i>Respiratory Protection:</i>	When it is not possible or feasible to eliminate airborne fiber, burn off fume or cristobalite dust levels below the PEL or REG through engineering controls, or until they are installed employees are encouraged to use good work practices together with respiratory protection. Before providing respirators to employees (especially negative pressure type), employers should 1) <u>monitor for airborne fibers and respirable cristobalite concentrations using NIOSH method 7400(B) and 7500 respectively and select the appropriate respiratory protection based upon the results of that monitoring,</u> 2) have the workers evaluated by a physician to determine the workers' ability to wear respirators, and 3) implement

respiratory protection training programs.

Use NIOSH/MSHA approved respirators, in compliance with OSHA Respiratory Protection Standard 29 CFR 1910.134 and 29 CFR 1926.103, for the particular hazard or airborne concentrations to be encountered in the work environment.

**Minimum Acceptable Respiratory Type
When Handling RCF Products**

AS-PRODUCED OR "VIRGIN" FIBERS		AFTER-SERVICE FIBERS/CRISTOBALITE	
<u>CONCENTRATION*</u>	<u>RESPIRATOR**</u>	<u>CONCENTRATION*</u>	<u>RESPIRATOR**</u>
Up to 1 fiber/cc	RECOMMENDED: Disposable dust/mist respirator (e.g. 3M 9900)		
1 - 5 fibers/cc	Half-face, air-purifying respirator equipped with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 Series)	Up to 5 fibers/cc or Up to 0.5 mg/m ³ respirable cristobalite	Half-face, air purifying respirator with high-efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 Series)
5 - 25 fibers/cc	Full-face air purifying respirator with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) equipped with HEPA filter cartridges (e.g. 3M W3265S with W3267 filters)	5-25 fibers/cc or 0.5-2.5 mg/m ³ respirable cristobalite	Full-face air purifying respirator equipped with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) equipped with HEPA filter cartridges (e.g. 3M W3265S with W3267 filters)
Greater than 25 fibers/cc	Full-face positive pressure supplied air respirator (e.g. 3M 7800 with W9435 hose and W3196 regulator)	Greater than: 25 fibers/cc or 2.5mg/m ³ respirable cristobalite	Full-face positive pressure supplied air respirator (e.g. 3M 7800 with W9435 hose and W3196 regulator)

*Eight hour time weighted average (TWA) of concentrations determined by air samples collected and analyzed using NIOSH method 7400(B) for airborne fibers and method 7500 for cristobalite.

**During the first heat, a combination of organic vapor/dust/mist respirator may be required. Consult with a Industrial Hygienist.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

<i>Appearance and Odor:</i>	Liquid compounds	<i>Vapor Pressure:</i>	Not applicable
<i>Boiling Point:</i>	Not applicable	<i>Vapor Density:</i>	Not applicable
<i>Melting Point:</i>	> 3200 deg F (1768 deg C)	<i>Specific Gravity Range:</i>	2.5-2.7
<i>Water Solubility (%):</i>	Not soluble in water	<i>% Volatile by Volume:</i>	0

Chemical Family: Vitreous Aluminosilicate Fibers

SECTION X - STABILITY AND REACTIVITY

Hazardous Polymerization: Will not occur.
Chemical Incompatibilities: Hydrofluoric acid.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, oxide of nitrogen, reactive hydrocarbon, small amount of formaldehyde may accompany binder burn-off first use.

SECTION XI - TOXICOLOGICAL INFORMATION

Epidemiology:

Industry epidemiologic investigations of RCF production workers are ongoing.

The preliminary evidence, obtained from employees in RCF manufacturing facilities, is as follows:

- 1) There is no evidence of any fibrotic lung disease (interstitial fibrosis) on x-ray
- 2) There is no evidence of any lung disease among those employees exposed to RCF that have never smoked.
- 3) A statistical trend was observed in the exposed population between the duration of exposure to RCF and a decrease in some measures of pulmonary function. These observations are clinically insignificant. In other words, if these observations were made on an individual employee, the results would be interpreted as being within the normal range.
- 4) Pleural plaques (thickening along the chest wall) have been observed in a small number of employees who had a long duration of employment. There are several occupational and non-occupational causes for pleural plaque. It should be noted that plaques are not pre-cancer nor are they associated with any measurable effect on lung function.

Toxicology:

A number of studies on the health effects of inhalation exposure of rats and hamsters are now reaching completion. In a lifetime nose-only inhalation study, rats exposed to the Maximum Tolerated Dose of 30 mg/m³ (200 fibers/cc) developed progressive lung damage (interstitial fibrosis) and cancers of the lung and of the pleura (lining of the chest wall and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma.

A multiple dose study in rats (3,9,16 mg/m³; approximately 25,75,115 fibers/cc, respectively) has been concluded after 29 months. These study data clearly demonstrate a dose-response relationship to the biological effects of RCF in rats. There is RCF related increase in lung tumors at either 3,9, or 16mg/m³. A pleural fibrosis and mesothelioma were seen in a single rat in the mid-dose (9mg/m³) group. In addition, no consistently diagnosed fibrosis was seen below 9mg/m³. Pulmonary fibrosis was observed at 9 and 19mg/m³.

The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool) in 1987. IARC's classification of ceramic fiber was based on sufficient evidence of carcinogenicity in experimental animals and inadequate evidence (no data) of the carcinogenicity of ceramic fibers to humans. Based on animal tests, ethylene glycol may be a reproductive hazard.

SECTION XII - ECOLOGICAL INFORMATION

Adverse effects of this material on the environment are not anticipated.

SECTION XIII - DISPOSAL INFORMATION

Waste Management/

Disposal:

Comply with federal, state, and local regulations. Method of disposal: Landfill (reportable quantities (RQ) not applicable). Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate, or otherwise inappropriate.

RCRA:

If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product or derived from 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).

SECTION XIV - TRANSPORT INFORMATION

Department of Transportation (D.O.T.):

Hazard Class:	Not regulated.	United Nations (UN) Number:	Not applicable.
Labels:	Not applicable.	North America (NA) Number:	Not applicable.
Placards:	Not applicable.		
Bill of Lading:	Product Name.		

SECTION XV - REGULATORY INFORMATION

SARA Title III: This product contains ethylene glycol that is reportable under Section 313 (40 CFR 372).

OSHA: Comply with Hazard Communication Standard 29 CFR 1910.1200 and 29 CFR 1926.59, Respiratory Protection Standard 29 CFR 1910.134 and 29 CFR 1926.103.

TCSA Inventory: All substances contained in this product are listed in the TSCA Chemical Inventory.

California: Listed as "Ceramic Fibers (airborne particles of respirable size)" Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986.

SECTION XVI - OTHER INFORMATION

Precautions To Be Taken After Service and Upon Removal: As manufactured, RCF products are aluminosilicates which may transform upon heating at temperatures above 1800 deg F to mullite and cristobalite (a form of crystalline silica). Removal of RCF products after service may generate respirable dust. Prolonged/repeated inhalation of respirable free crystalline silica dust may cause delayed lung injury (silicosis). IARC has placed crystalline silica in Category 2A (IARC believes there is sufficient evidence of carcinogenicity in animals but evidence of the carcinogenicity to humans is limited). The OSHA PEL for respirable cristobalite is 0.05 mg/m³. Appropriate ventilation and respiratory protection should be

provided in compliance with OSHA Standards 29 CFR 1910.94 and 29 CFR 1926.57 and 1910.134 and CFR 1926.103, respectively.

Definitions:

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS#:	Chemical Abstracts Service Number
EPA:	Environmental Protection Agency
f/cc:	Fibers per cubic centimeter
HEPA:	High Efficiency Particulate Air
mg/m ³ :	Milligrams per cubic meter of air
MSHA:	Mine Safety and Health Administration
NIOSH:	National Institute for Occupational Safety and Health
OSHA:	Occupational Safety and Health Administration
RCRA:	Resource Conservation & Recovery Act
SARA:	Superfund Amendments and Reauthorization Act
TITLE III:	Emergency Planning and Community Right To Know Act
Section 313:	Toxic Chemical Release Inventory Reporting
TCLP:	Toxicity Characteristics Leaching Procedures (EPA)
TLV:	Threshold Limit Values (ACGIH)
TSCA:	Toxic Substance Control Act
29 CFR 1910.134 and 29 CFR 1926.103:	OSHA Respiratory Protection Standard
29 CFR 1910.1200 and 19 CFR 1926.59:	OSHA Hazard Communications Standard
29 CFR 1910.94 and 29 CFR 1926.57:	OSHA Ventilation Standard

Revision: Replaces revision dated July 19, 1994. Corrected CAS# for Silica, Amorphous is Section 2.
Label: 01-0991

Reasonable care has been taken in the preparation of the information contained in this Material Safety Data Sheet and is given in good faith. However, Thermal Ceramics Inc. assumes no responsibility as to the accuracy or suitability of such information and no warranty, expressed or implied, is made.