



MATERIAL SAFETY DATA SHEET

FIBRECAST CERAMIC FIBRE MODULES

Effective Date: Nov 20, 2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Group: Manufactured article - refractory ceramic fibre module
 Chemical Name: Vitreous Aluminosilicate fibre (with zirconia)
 Synonyms: Refractory ceramic fibre (RCF), Ceramic Fibre, Man-Made Vitreous Fibre (MMVF)
 Trade Names: **FibreCast Bull Nose Module (BNM) – HP**
FibreCast Composite Module (CPM) – ZR/HP
FibreCast Edge Grain Module (EGM) – HP
FibreCast Edge Grain Module (EGM) – Z (with zirconia)
FibreCast Folded Module (FDM) – HP
FibreCast Folded Module (FDM) – Z (with zirconia)
FibreCast Shiplap Module (SLM-EG) – HP
FibreCast Shiplap Module (SLM-EG) – Z (with zirconia)
FibreCast Shiplap Module (Folded) (SLM-FD) – HP
FibreCast Shiplap Module (Folded) (SLM-FD) – Z (with zirconia)
 Manufacturer/Supplier: **FibreCast Incorporated, 3264 Mainway, Burlington, Ontario, Canada L7M 1A7**
Phone 905-319-1080; Fax 905-319-7611
 Customer Support: www.sales@fibrecast.com

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS #	% BY WEIGHT
Aluminosilicate refractory fibres(some with zirconia)	142844-00-6	80 to 90
Stainless steel (as support hardware)	none	7 to 13
Retainer hardware – plastic cap	none	0.1 to 1.0

3. LABEL INFORMATION

Manufactured Article – RCF Module

WHMIS Symbol: Toxic – Class D, Division 2A – Materials Causing Other Toxic Effects (for tear out situations)



Risk Phrases:

This product contains ceramic fibre, a substance that has been identified by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans. Follow safety instructions as stated in the MSDS.

Ceramic fibre may cause temporary skin and upper respiratory tract irritation. Exposure to respirable dust and fibre should be minimized. Product which has been in service above 1800 °F (980 °C) may undergo partial conversion to a cristobalite, a crystalline form of silica. Respirable crystalline silica is classified by IARC as a known human carcinogen.

Precautionary Measures:

Avoid breathing dust and contact with skin and eyes. Wear NIOSH approved respirator for airborne concentrations above 0.5 fibre/cc and in dust concentrations above 0.05 mg/m³ of respirable cristobalite. Wear long-sleeved, loose fitting clothing, gloves and eye protection. Use with adequate ventilation. Wash all exposed areas gently with soap and water after contact.

First Aid Measures:

If eyes become irritated, flush with water for 15 minutes. If skin becomes irritated, wash gently with soap and water, if irritation persists, consult physician. If breathing difficulties develop, remove from exposure and call physician immediately.

Refer to the Material Safety Data Sheet for further information

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4. HAZARDS IDENTIFICATION

Chronic Effect: There has been no increased incidence of respiratory disease in studies examining occupationally exposed workers. In animal studies, long-term, laboratory exposure to doses hundreds of times higher than normal occupational exposures has produced fibrosis, lung cancer, and mesothelioma in rats and hamsters. The fibres used in those studies were specially sized to maximize rodent respirability.

Other Potential Effects: Target Organs: respiratory tract (nose & throat), eyes, skin.

Respiratory Tract (nose and throat) Irritation: If inhaled in sufficient quantity, may cause temporary, mild mechanical irritation to respiratory tract. Symptoms may include scratchiness of the nose or throat, cough or chest discomfort.

Eye Irritation: Handling new product may also cause temporary, mild irritation. Fibres maybe abrasive; prolonged contact may cause damage to the outer surface of the eyes.

Skin Irritation: May cause temporary, mild mechanical irritation. Exposure may also result in inflammation, rash or itching.

Gastrointestinal Irritation: Unlikely route of exposure.

Medical Conditions aggravated by Exposure: Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease may be aggravated by exposure; individuals who have a history of allergies may experience greater amounts of skin and respiratory irritation.

Hazard Classification: Although studies, involving occupationally exposed workers, have not identified any increased incidence of respiratory disease, results from animal testing have been used as the basis for hazard classification. In each of the following cases, the conclusions are qualitative only and do not rest upon any quantitative analysis suggesting that the hazard actually may occur at current occupational exposure levels. In October 2001, the International Agency for Research on Cancer (IARC) confirmed that Group 2B (possible human carcinogen) remains the appropriate IARC classification for RCF. The Seventh Annual Report on Carcinogens (1994) prepared by the National Toxicology Program (NTP) classified respirable RCF and glass wool as substances reasonably anticipated to be carcinogens. The American Conference of Governmental Industrial Hygienists (ACGIH) has classified RCF as "A2-Suspected Human Carcinogen." The Commission of The European Communities (DG XI) has classified RCF as a substance that should be regarded as if it is carcinogenic to man. The State of California, pursuant to Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986, has listed "ceramic fibres (airborne fibres of respirable size)" as a chemical known to the State of California to cause cancer. The Canadian Environmental Protection Agency (CEPA) has classified RCF as "probably carcinogenic (group 2). The Canadian Workplace Hazardous Materials Information System (WHMIS) has classified refractory ceramic fibres as a Class D2A - Materials Causing other Toxic Effects.

5. First Aid Measures

Respiratory Tract (nose & throat) Irritation: If respiratory tract irritation develops, move the person to a dust free location. Get medical attention if the irritation continues. See Section 8 for additional measures to reduce or eliminate exposure.

Eye Irritation: If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes. Get medical attention if irritation persists.

Skin Irritation: If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash the area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.

Gastrointestinal Irritation: If gastrointestinal tract irritation develops, move the person to a dust free environment.

Notes to Physicians: Skin and respiratory effects are the result of temporary, mild irritation; fibre exposure does not result in allergic manifestations.

6. FIRE FIGHTING MEASURES

NFPA Unusual Hazards: None

Flammable Properties: None

Flash Point: None

Hazardous Decomposition Products(after service): Product that has been in service at or above about 1800⁰ F (982⁰ C) may undergo partial conversion to a cristobalite, a crystalline form of silica.

Unusual Fire and Explosion Hazard: None

Extinguishing Media: Use extinguishing media suitable for type of surrounding fire.

7. ACCIDENTAL RELEASE MEASURES

Avoid creating airborne dust. Dust suppressing cleaning methods such as wet sweeping or vacuuming should be used to clean the work area. If vacuuming, the vacuum must be equipped with a HEPA filter. Compressed air or dry sweeping should not be used for cleaning. Refer to local Regulations about compressed air limitations for cleaning.

8. HANDLING AND STORAGE

Storage: Store in original container in a dry area. Keep container closed when not in use.

Handling: Handle man-made fibre products carefully. Limit use of power tools unless used in conjunction with local exhaust. Use hand tools whenever possible. Frequently clean the work area with HEPA filtered vacuum or wet sweeping to minimize the accumulation of debris. Do not use compressed air for clean up – Government regulations limit the use of compressed air for clean up.

Empty Containers: Product packaging may contain residue. Do not reuse.

9. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure limits for refractory ceramic fibre: 0.5 f/cc, 8-hr. TWAEV - refer to statement below

Unlike Canada, which recommends 0.2 to 1 f/cc as the TWAEV for RCF (depending on the province), there is no specific regulatory standard for refractory ceramic fibre in the U.S. It uses the OSHA "Particulate Not otherwise Regulated (PNOR)" standard (29CFR 1910.1000 Subpart Z, Air Contaminants) that considers it as part of a Total Dust TWAEV of 15 mg/m³ with a Respirable Fraction of 5 mg/m³.

****The Refractory Ceramic Fibres Coalition (RCFC)** has sponsored comprehensive toxicology and epidemiology studies to identify potential RCF-related health effects (see Section 12 for more details), consulted experts familiar with fibre and particle science, conducted a thorough review of the RCF-related scientific literature, and further evaluated the data in a state of the art quantitative risk assessment. Based on these efforts and in the absence of an OSHA PEL, the RCFC has adopted a recommended occupational exposure guideline, as measured under the NIOSH Method 7400 B. The manufacturers' recommendation is intended to promote occupational health and safety through prudent exposure control and reduction and it reflects relative technical and economic feasibility as determined by extensive industrial hygiene monitoring efforts undertaken pursuant to an agreement with the US Environmental Protection Agency.

Other Occupational Exposure Levels (OEL) RCF-related occupational exposure limits vary internationally. Regulatory OEL examples include: Australia – 0.5 f/cc; Austria – 0.5 f/cc; Canada – 0.2 to 1.0 f/cc; Denmark – 1.0 f/cc; France – 0.6 f/cc; Germany – 0.5 f/cc; Netherlands – 1.0 f/cc; New Zealand – 1.0 f/cc; Norway – 2.0 f/cc; Poland – 2.0 f/cc; Sweden – 1.0 f/cc; United Kingdom – 2.0 f/cc; Non-regulatory OEL examples include: ACGIH TLV 0.2 f/cc; RCFC recommendation - 0.5 f/cc. The objectives and criteria underlying each of these OEL decisions also vary. The evaluation of occupational exposure limits and determining their relative applicability to the workplace is best performed, on a case-by-case basis, by a qualified Industrial Hygienist.

Engineering Controls - Use engineering controls such as local exhaust ventilation, point of generation dust collection, down draft work stations, emission controlling tool designs and materials handling equipment designed to minimize airborne fibre and dust emissions.

Personal Protection Equipment - Respiratory Protection for man-made mineral fibres: When engineering and/or administrative controls are insufficient, the use of appropriate respiratory protection is recommended. The following information is provided as an example of appropriate respiratory protection for aluminosilicate fibres. The evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed on a case-by-case basis by a qualified Industrial Hygienist.

Manufacturer's Respiratory Protection Recommendations When Handling Refractory Ceramic Fibre Products:

Respirable Airborne Fibre Concentration

- less than 0.5 f/cc
- 0.5 to 5.0 f/cc
- 5.0 to 25 f/cc

Respirator Recommendation

To be based on workplace conditions present
 Disposable respirator with NIOSH approved N95 cartridge
 Min.– Full facepiece respirator with NIOSH N100 cartridge

The N95 recommendation is a minimum default choice. In some case, solid arguments can be made that other respirator types (e.g. N100, etc.) may be suitable for some tasks or work environments. The N95 recommendation is not designed to limit informed choices, provided that respiratory protection decisions comply with 29 CFR 1910.134 and are combined with occupational studies covering the activities involved.

Other Information: Concentrations outlined above are based upon an eight-hour time weighted average (TWA) as determined by air samples collected and analyzed over sufficient exposure periods. The manufacturer recommends, as a minimum, the use of a quality air purifying respirator equipped with an appropriate particulate filter cartridge during furnace tear-out events or the removal of used refractory ceramic fibre and mineral wool fibres, to control exposures to airborne fibre in the potential presence of crystalline silica and airborne fibre. A qualified Industrial Hygienist should evaluate potential exposure to other airborne contaminants that could also be present from other products. The selection of appropriate respiratory protection and air monitoring will depend upon conditions present in the work environment.

Skin Protection: Wear gloves, head coverings and full body clothing as necessary to prevent skin irritation. Washable or disposable clothing may be used. If possible, do not take unwashed clothing home. If soiled work clothing must be taken home, employers should ensure employees are thoroughly trained on the best practices to minimize or avoid non-work dust exposure (e.g. vacuum clothes before leaving the work area, wash work clothing separately, rinse washer before washing other household clothes, etc.)

Eye Protection: Wear safety glasses with side shields or other forms of eye protection in compliance with appropriate CSA standards to prevent eye irritation. The use of contact lenses is not recommended, unless used in conjunction with appropriate eye protection. Do not touch eyes with soiled body parts or materials. If possible, have eye-washing facilities readily available where eye irritation can occur.

10. PHYSICAL AND CHEMICAL PROPERTIES

Odour and Appearance:	Off white, odourless, fibrous material manufactured into a modular shape
Chemical Family:	Synthetic vitreous fibres
Boiling Point	Not applicable
Water Solubility (%):	Not Soluble in Water
Melting Point	> 2150 °C (2300 °F) for modules with suffix HP in product title and > 2450 °C (2600 °F) for modules with suffix Z in product title
Relative Density (pounds/ft ³)	6 to 12 depending on type of module
Vapour Pressure	Not Applicable
pH:	Not Applicable
Vapour Density (Air = 1):	Not Applicable
% Volatile:	Not Applicable

11. STABILITY AND REACTIVITY

Chemical Stability:	Stable under conditions of normal use.
Incompatibility:	Soluble in hydrofluoric acid, phosphoric acid and concentrated alkali
Conditions to Avoid:	None.
Hazardous Decomposition Products:	None anticipated
Hazardous Polymerization:	Not applicable.

12. TOXICOLOGICAL INFORMATION

Health Data Summary: There has been no reported increased incidence of respiratory disease or other significant health effects in occupationally exposed workers. In animal studies, long-term, high-dose inhalation exposure resulted in the development of respiratory diseases in rats and hamsters.

Toxicology A number of toxicological studies designed to identify and potential health effects from refractory ceramic fibre exposure have been completed. In one study, conducted by the Research and Consulting Company, (Geneva, Switzerland), rats and hamsters were exposed to 30 mg/m³ (about 200 fibres/cc) of specially-prepared RCF for 6 hours/day, 5 days/week, for up to 24 months. In rats, a statistically significant increase in lung tumors was observed; two mesotheliomas (cancer of the pleural lining between the chest wall and lung) were also identified. Hamsters did not develop lung tumors; however, interstitial fibrosis and mesothelioma was found. Some of the scientific community, have concluded that the “maximum tolerated dose” was exceeded and that significant particle contamination was a confounding issue; therefore, these study findings may not represent an accurate assessment of the potential for RCF to produce adverse health effects.

In a related multi-dose study with a similar protocol, other rats were exposed to doses of 16 mg/m³, 9 mg/m³, 3 mg/m³ that corresponds to about 115, 75, and 25 fibres per cubic centimetre respectively. This study found no statistically significant increase in lung cancer. Some cases of pleural and parenchymal fibrosis were seen in the 16 mg/m³ dose group. Some cases of mild fibrosis and one mesothelioma were observed in the 9mg/m³ groups. No acute respiratory effects were seen in the rats in the 3-mg/m³ exposure group, which suggests that there may be a dose response threshold, below which irreversible respiratory impacts do not occur.

Other toxicological studies have been conducted which utilized non-physiological exposure methods such as intrapleural, intraperitoneal and intratracheal implantation or injection. Some of these studies have found refractory ceramic fibre is a potential carcinogen. Some experts, however, suggest that these tests have limited relevance because they bypass many of the biological mechanisms that present fibre deposition or facilitate fibre clearance.

13. ECOLOGICAL INFORMATION

No ecological concerns have been identified.

14. DISPOSAL CONSIDERATIONS

Waste Management To prevent waste materials from becoming airborne during waste storage, transportation and disposal, a covered container or plastic bagging is recommended.

Disposal: Man-made fibre, as manufactured, is not classified as a hazardous waste according to present Federal regulations. Any processing, use, alteration or chemical additions to the product, as purchased, may alter the disposal requirements Under Federal regulations, it is the waste generator’s responsibility to properly characterize a waste material to determine if it is a “hazardous” waste. Check local, regional, state or provincial regulations to identify all applicable disposal requirements.

15. TRANSPORTATION INFORMATION

Canadian Transportation of Dangerous Goods Regulation: Hazard Class & PIN: Non Regulated
Not classified as dangerous goods under ADR (road), RID (train), or IMDG (ship).

16. REGULATIONS

Canadian Workplace Hazardous Materials Information System (WHMIS) applies when product is being torn out after a high temperature application. This results in the RCF being classified as Class D2A – Materials Causing Other Toxic Effects. The product as shipped and installed is a manufactured article and does not require WHMIS labelling. Other materials in tear out may also contribute to the airborne dust. A specific evaluation of workplace hazards and the identification of appropriate respiratory protection are best performed on a case-by-case basis by a qualified industrial hygiene professional.

OTHER INFORMATION

Refractory Ceramic Fibre Devitrification

As produced, all RCF fibres are vitreous (glassy) materials, which do not contain crystalline silica. Continued exposure to elevated temperatures may cause these fibres to devitrify (become crystalline). The first crystalline formation (mullite) begins to occur at approximately 985 °C (1805 °F). Crystalline silica (cristobalite) formation may begin at temperatures of approximately 1200 °C (2192 °F). The occurrence and extent of crystalline phase formation is dependent on the duration and temperature of exposure, fibre chemistry and/or the presence of fluxing agents. The presence of crystalline phases can be confirmed only through laboratory analysis of the "hot face" fibre.

IARC's evaluation of crystalline silica states, "Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)" and additionally notes, "Carcinogenicity in humans was not detected in all industrial circumstances studied" (IARC Monograph Vol. 68,1997). NTP lists all polymorphs of crystalline silica amongst substances, which may "reasonably be anticipated to be carcinogens".

Refractory Ceramic Fibre After Service Removal

Respiratory protection should be provided in compliance with local, provincial, federal and state standards. During removal operations, an appropriate air-purifying respirator is recommended to reduce inhalation exposure coupled with suitable eye protection. A specific evaluation of workplace hazards and the identification of appropriate respiratory protection are best performed on a case-by-case basis by a qualified industrial hygiene professional.

17. PREPARATION INFORMATION

This MSDS was prepared November 20, 2006 by G.E.Menzies P.Eng. ROH. For more information, phone 905-319-1080; fax 905-319-7611 or visit our FibreCast website.

DISCLAIMER

The information presented herein is presented in good faith and believed to be accurate as of the effective date of this Material Safety Data Sheet. Occupational exposure limits are under constant review and may be changed at any time. Employers may use this MSDS to supplement other information gathered by them in their efforts to assure the health and safety of their employees and the proper use of this product. This summary of the relevant data reflects professional judgment. Employers should note that information perceived to be less relevant has not been included in this MSDS. Therefore, given the summary nature of this document, FibreCast Inc. does not extend any warranty (expressed or implied), assume any responsibility or make any representation regarding the completeness of this information or its suitability for the purposes envisioned by the user.