FIBRECAST INC.
Refractories • Vacuum-Forming • Engineering

SAFETY DATA SHEET

FC 2300 SteelBoard HS

Effective Date February 25th, 2020

1. IDENTIFICATION

(a) Product Identifier used on label: **FC 2300 SteelBoard HS as Boards and Shapes**
(b) Other means of identification: High Temperature RCF Vacuum Formed Insulation Product**;** High Temperature Insulating Ceramic Vacuum-Formed Boards and Shapes; High Temperature Insulating Product as a blend of Refractory Ceramic Fibre and binders; Refractory Ceramic Fibre (RCF), Ceramic Wool, Man-Made Vitreous Fibre (MMVF), High Temperature Insulating Wool (HTIW)
(c**)** Recommended use of the product: Primary Use: Refractory Ceramic Fiber (RCF) materials are used primarily in industrial high temperature insulating applications. Examples include back-up insulating for molten steel ladles, electric arc furnaces, torpedo cars, tundishes, heat shields, heat containment, expansion joints, industrial furnaces, ovens, kilns, boilers and other process equipment at applications up to 1204 deg C [2200 deg F]. Melting point of product is 1760 deg C or 3200 deg F. Ceramic fiber-based products are not intended for direct sale to the general public. While ceramic fiber is used in the manufacture of some consumer products, such as catalytic converter mats and wood burning stoves, the materials are contained, encapsulated, or bonded within the units.
Tertiary Use: Installation, removal (industrial and professional) / Maintenance and service life (industrial and professional).
Uses Advised Against: Dismantling product for use in other applications.
(d) Manufacturer Name **FibreCast Incorporated, 3264 Mainway, Burlington, Ontario, Canada, L7M 1A7**
Phone 905-319-1080; Fax 905-319-7611; Email sales@fibrecast.com
(e) Emergency Phone #: CHEMTREC will help with chemical emergencies at 1-800-424-9300

2. HAZARDS IDENTIFICATION

(a) Classification of the chemical is based in Canada on the 5th revised edition of the Globally Harmonized System of Classification and Labelling of Chemicals from the United Nations Economic Commission for Europe and in the USA, it is based on the US Occupational Safety and Health Administration Hazard Communication Standards of 2012. These standards indicate that that the product is considered as IARC Group 2B which corresponds to a Category 2 carcinogen classification.
(b) Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200. Ceramic fiber is classified as a category 2 carcinogen.
Hazard Pictogram

Signal Word: Warning
Hazard Statements: Suspected of causing cancer by inhalation.
Precautionary statements: Do not handle until all safety instructions have been read and understood. Use respiratory protection as required; see section 8 of the Safety Data Sheet. If concerned about exposure, get medical advice. Store in a manner to minimize airborne dust. Dispose of waste in accordance with local, provincial or state and federal regulations.
Supplementary Information: May cause temporary mechanical irritation to exposed eyes, skin or respiratory tract. Minimize exposure to airborne dust.
(c) Describe any hazards not otherwise classified that have been identified during the classification process: Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure.
These effects are usually temporary.
(d) Mixture rule: Not applicable.

3. COMPOSITION / INFORMATION ON INGREDIENTS

(a) Chemical and (b) common name	(c) CAS number	% by weight
Refractories, Fibres Aluminosilicate	142844-00-6	45 to 70
Silicon dioxide (quartz)	14808-60-7	15 to 40

Colloidal Silica	7631-86-9	10 to 30
Cationic Starch Ether	56780-58-6	1 to 5

*Synonyms: RCF; ceramic fibre; alumino silicate wool [ASW]; synthetic vitreous fibre [SVF]; man-made vitreous fibre [MMVF]; man-made mineral fibre [MMMF]; high temperature insulation wool [HTIW]

(d) Impurities and stabilizing additives: Not applicable

4. FIRST AID MEASURES

(a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion

SKIN: Handling of this material may generate mild mechanical temporary skin irritation. If this occurs, rinse affected areas with water and wash gently. Do not rub or scratch exposed skin.

EYES: In case of eye contact flush abundantly with water; have eye bath available. Do not rub eyes.

NOSE AND THROAT: If these become irritated move to a dust free area, drink water and blow nose. If symptoms persist, seek medical advice.

(b) Most important symptoms/effects, acute and delayed: Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure. These effects are usually temporary.

(c) Indication of immediate medical attention and special treatment needed, if necessary

NOTES TO PHYSICIANS Skin and respiratory effects are the result of temporary, mild mechanical irritation; fiber exposure does not result in allergic manifestations.

5. FIRE FIGHTING MEASURES

(a) Suitable (and unsuitable) extinguishing media: Use extinguishing agent suitable for surrounding combustible materials.

(b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products): Product is non-combustible products, class of reaction to fire is zero. Packaging and surrounding materials may be combustible.

Initial Heat: During the initial heating of the product, some thermal decomposition of the organic binder will occur at about 450^0 F (232 ^{0} C) from this first heat of the product. This may release smoke, carbon monoxide and carbon dioxide. Use adequate ventilation or other precautions to eliminate exposure to vapours resulting from thermal decomposition of the binder. Exposure to the thermal decomposition fumes may cause respiratory tract irritation, bronchial hyper-reactivity or an asthmatic-type response. Product that has been in service at or above 1800 ^{0} F may undergo partial conversion to cristobalite, a crystalline form of silica

(c) Special protective equipment and precautions for fire-fighters: NFPA Codes: Flammability: 0 Health: 1 Reactivity: 0 Special: 0 [opposite of WHMIS2015 ratings]

6. ACCIDENTAL RELEASE MEASURES

(a) Personal precautions, protective equipment, and emergency procedures: Minimize airborne dust. Compressed air or dry sweeping should not be used for cleaning. See Section 8 "Exposure Controls / Personal Protection" for exposure guidelines.

(b) Methods and materials for containment and cleaning up: Frequently clean the work area with high efficiency vacuum or wet sweeping to minimize the accumulation of debris. Do not use compressed air for clean-up, as most jurisdictions limit compressed air for cleaning purposes.

EMPTY CONTAINERS: Product packaging may contain residue. Do not reuse.

7. HANDLING AND STORAGE

(a) Precautions for safe handling: Handle fiber carefully to minimize airborne dust. Limit use of power tools unless in conjunction with local exhaust ventilation. Use hand tools whenever possible.

(b) Conditions for safe storage, including any incompatibilities: Store in a manner to minimize airborne dust.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

(a) Canadian provincial OEL's [TWAEV's] for ceramic fiber range from 0.2 to 1.0 f/cc depending on the province. In Ontario, the **Ontario TWAEV for RCF** [refractory ceramic fibre**] is 0.5 f/cc, 8-hr**. 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.

Product Components	CAS	%	Ontario TWAEV
Refractory Ceramic fibre	142844-00-6	45 to 70	0.5 f/cc, 8-hr.
Silicon Dioxide	14808-60-7	15 to 40	10 mg/m^3 as inhalable particles; 3mg/m^3 as respirable particles
Colloidal silica	7631-86-9	10 to 30	10 mg/m^3 as inhalable particles; 3mg/m^3 as respirable particles
Cationic starch ether	56780-58-6	1 to 5	10 mg/m^3 as inhalable particles; 3mg/m^3 as respirable particles

(b) Appropriate engineering controls: Use engineering controls such as local exhaust ventilation, point of generation dust collection and materials handling equipment designed to minimize airborne fiber emissions.

(c) Individual protection measures, such as personal protective equipment

Skin Protection: Wear personal protective equipment (e.g. gloves), 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, employees should be informed on best practices to minimize non-work dust exposure (e.g., vacuum clothes before leaving the work area, wash work clothing separately, and rinse washer before washing other household clothes).
Eye Protection: As necessary, wear goggles or safety glasses with side shields.
Respiratory Protection: When engineering and/or administrative controls are insufficient to maintain workplace concentrations below the 0.5 f/cc recommended exposure limit (REL), the use of appropriate respiratory protection, is recommended. A NIOSH certified respirator with a filter efficiency of at least 95% should be used. The 95% filter efficiency recommendation is based on NIOSH respirator selection logic sequence for exposure to man-made mineral fibers. Workers need to be fit-tested prior to using a specific air-purifying respirator.
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.
Other Information: Concentrations based upon an eight-hour time weighted average (TWA) as determined by air samples collected and analyzed pursuant to NIOSH method 7400 (B) for airborne fibers. The manufacturer recommends the use of a full-face piece air purifying respirator equipped with an appropriate particulate filter cartridge during furnace tear-out events and the removal of used RCF.

9. PHYSICAL AND CHEMICAL PROPERTIES

(a) Appearance	Off white to light brown, fibrous material manufactured into a modular shape	**(j) Upper/lower flammability or explosive limits**	Not applicable
(b) Odour	Odourless	**(k) Vapor pressure**	Not applicable
(c) Odour threshold	Not applicable	**(l) Vapor density**	Not applicable
(d) pH	Not applicable	**(m) Density[#/ft^3]**	66
(e) Melting point	1760° C (3200° F)	**(n) Solubility**	Insoluble
(f) Initial boiling point and boiling range	Not applicable	**(o) Partition coefficient: n-octanol/water**	Not applicable
(g) Flash point	Not applicable	**(p) Auto-ignition temperature**	Not applicable
(h) Evaporation rate	Not applicable	**(q) Decomposition temperature**	Not applicable
(i) Flammability	Not applicable	**(r) Viscosity**	Not applicable

10. STABILITY AND REACTIVITY

(a) **Reactivity**	Ceramic fiber is non-reactive.
(b) **Chemical stability**	As supplied ceramic fiber is stable and inert.
(c) **Possibility of hazardous reactions**	None
(d) **Conditions to avoid**	Please refer to handling and storage advice in Section 7
(e) **Incompatible materials**	None
(f) **Hazardous decomposition products**	During the initial heating of the product, some thermal decomposition of the binder will occur at about 450 ^{0}F (232 ^{0}C) from this first heat of the product. This may release smoke, carbon monoxide and carbon dioxide. Use adequate ventilation or other precautions to eliminate exposure to vapours resulting from thermal decomposition of the binder. Exposure to thermal decomposition fumes may cause respiratory tract irritation, bronchial hyper-reactivity or an asthmatic-type response.

11. TOXICOLOGICAL INFORMATION

(a) through (d)
TOXICOKINETICS, METABOLISM AND DISTRIBUTION
Basic Toxicokinetics: Exposure is predominantly by inhalation or ingestion. Man-made vitreous fibers of a similar size to ceramic fiber have not been shown to migrate from the lung and/or gut and do not become located in other organs of the body.
Human Toxicological Data/Epidemiology Data: In order to determine possible human health effects following ceramic fiber exposure, the University of Cincinnati has been conducting medical surveillance studies on RCF workers in the

U.S.A; this epidemiological study has been ongoing for >30 years and medical surveillance of RCF workers continues. Medical surveillance studies on RCF workers is also being done in European manufacturing facilities.
Pulmonary morbidity studies among production workers in the U.S.A. and Europe have demonstrated an absence of interstitial fibrosis. In the European study a reduction of lung capacity among smokers has been identified, however, based on the latest results from a longitudinal study of workers in the U.S.A. with over 17-year follow-up, there has been no accelerated rate of loss of lung function.
A statistically significant correlation between pleural plaques and cumulative RCF exposure was evidenced in the U.S.A. longitudinal study. The U.S.A. mortality study showed no excess mortality related to all deaths, all cancer, or malignancies

Irritant Properties

Human data confirm that only mechanical irritation, resulting in itching, occurs in humans. Screening at manufacturers' plants in the UK has failed to show any human cases of skin conditions related to fiber exposure.

(e) International Agency for Research on Cancer and National Toxicology Program

IARC classified RCF as possibly carcinogenic to humans (group 2B). IARC evaluated the possible health effects of RCF as follows: There is inadequate evidence in humans for the carcinogenicity of RCF. There is sufficient evidence in experimental animals for the carcinogenicity of RCF. The Annual Report on Carcinogens classified respirable RCF as "reasonably anticipated" to be a carcinogen).

12. ECOLOGICAL INFORMATION (Non-mandatory)

(a) Ecotoxicity (aquatic and terrestrial, where available)	No known aquatic toxicity.
(b) Persistence and degradability	These products are insoluble materials that remain stable over time and are chemically identical to inorganic compounds found in the soil and sediment; they remain inert in the natural environment.
(c) Bio accumulative potential	No bio accumulative potential.
(d) Mobility in soil	No mobility in soil.
(e) Other adverse effects (such as hazardous to the ozone layer)	No adverse effects of this material on the environment are anticipated.

13. DISPOSAL CONSIDERATIONS (Non-mandatory)

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

DISPOSAL: This product, as manufactured, is not classified as a hazardous waste according to 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.

14. TRANSPORT INFORMATION (Non-mandatory)

(a) UN number	Not Applicable
(b) UN proper shipping name	Not Applicable
(c) Transport hazard class(es)	Not Applicable
(d) Packing group, if applicable	Not Applicable
(e) Environmental hazards (e.g., Marine pollutant (Yes/No))	Not a marine pollutant
(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)	Not Applicable
(g) Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises	Not Applicable

Canadian TDG Hazard Class & PIN: Not regulated

Not classified as dangerous goods under ADR (road), RID (train) or IMDG (ship).

15. REGULATORY INFORMATION (Non-mandatory)

CANADIAN REGULATIONS

Canada Canadian Workplace Hazardous Materials Information System (WHMIS 2015) – **Classified as Class D2A** – Materials Causing Other Toxic Effects

Canadian Environmental Protection Act (CEPA) - All substances in this product are listed, as required, on the Domestic Substance List (DSL)

16. OTHER INFORMATION

16.1 Devitrification: Precautionary measures to be taken after service upon removal: High temperature insulating wool (HTIW) is typically used in insulation applications to keep temperature exposure at 900°C or above in a closed space. The exposure temperature maximum occurs at the hot face surface of the insulation. The heat exposure on the insulation

decreases from the hot face to the cold face as the insulation “insulates itself". As a result, only thin layers of the hot face surface of the insulation become devitrified and respirable dust generated during removal operations typically do not contain detectable levels of crystalline silica. Toxicological evaluation of the effect of the presence of crystalline silica in artificially heated HTIW material has not shown any increased toxicity in vitro and in vivo. The results from different factor combinations such as increased brittleness of fibres or micro crystals embedded in the glass structure of the fibre and therefore not biologically available, may explain the lack of toxicological effects. IARC evaluation as provided in Monograph 68 is not relevant since crystalline silica is not biologically available in after-service HTIW.

16.2 Hazardous Materials Identification System: This (HMIS) Hazard Rating [this rating system dates back to early 1960’s]

HMIS Health 1* (* denotes potential for chronic effects); HMIS Flammability 0; HMIS Reactivity 0; HMIS Personal Protective Equipment X (To be determined by user).

16.3 DEFINITIONS

ACGIH:	American Conference of Governmental Industrial Hygienists
ADR:	Carriage of Dangerous Goods by Road (International Regulation)
CAA:	Clean Air Act
CAS:	Chemical Abstracts Service
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
DSL:	Domestic Substances List
EPA:	Environmental Protection Agency
EU:	European Union
f/cc:	Fibres per cubic centimeter
HEPA:	High Efficiency Particulate Air
HMIS:	Hazardous Materials Identification System
IARC:	International Agency for Research on Cancer
IATA:	International Air Transport Association
IMDG:	International Maritime Dangerous Goods Code
mg/m³:	Milligrams per cubic meter of air
mmpcf:	Million particles per cubic meter
NFPA:	National Fire Protection Association
NIOSH:	National Institute for Occupational Safety and Health
OSHA:	Occupational Safety and Health Administration
29 CFR 1910.134 & 1926.103:	OSHA Respiratory Protection Standards
29 CFR 1910.1200 & 1926.59:	OSHA Hazard Communication Standards
PEL:	Permissible Exposure Limit (OSHA)
PIN:	Product Identification Number
PNOC:	Particulates Not Otherwise Classified
PNOR:	Particulates Not Otherwise Regulated
PSP:	Product Stewardship Program
RCRA:	Resource Conservation and Recovery Act
REL:	Recommended Exposure Limit (NIOSH)
RID:	Carriage of Dangerous Goods by Rail (International Regulations)
SARA:	Superfund Amendments and Reauthorization Act
SARA Title III:	Emergency Planning and Community Right to Know Act
SARA Section 302:	Extremely Hazardous Substances
SARA Section 304:	Emergency Release
SARA Section 311:	MSDS/List of Chemicals and Hazardous Inventory
SARA Section 312:	Emergency and Hazardous Inventory
SARA Section 313:	Toxic Chemicals and Release Reporting
STEL:	Short Term Exposure Limit`
SVF:	Synthetic Vitreous Fibre
TDG:	Transportation of Dangerous Goods
TLV:	Threshold Limit Value (ACGIH)
TSCA:	Toxic Substances Control Act
TWA:	Time Weighted Average
WHMIS:	Workplace Hazardous Materials Information System (Canada) 2015 version

16.4 Revision Summary: Updated SDS to align with the new WHMIS 2015 Regulation introduced, Feb 11th, 2015.
SDS Revision Date: February 25, 2020
SDS Prepared By: G.E. Menzies P. Eng. ROH

16.5 DISCLAIMER

The information presented herein is presented in good faith and believed to be accurate as of the effective date of this Safety Data Sheet. Employers may use this SDS to supplement other information gathered by them in their efforts to assure the health and safety of their employees and the proper use of the 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 SDS. 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.