

Unifrax Australia Pty. Ltd.

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FIBERFRAX® DURAFLEX

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION OF MATERIAL & SUPPLIER

Brand Name: FIBERFRAX®

Product Names: Fiberfrax® Duraflex

Ship. Name (CSN): None Allocated

Other Names: Fiberfrax Duraflex 1400
Carbolane Flexiform
Duraboard FX
Ceramic Fibre
Refractory Fibre
MMVF
SMF

UN Number None Allocated
DG Class None Allocated
Packaging Group None Allocated
Hazchem Code None Allocated
Poisons Schedule Not Scheduled
Product Use Thermal insulation

Manufacturer/Supplier: Unifrax **UK** Ltd
Mill Lane, Rainford
St. Helens
Merseyside. 20 WA118L
UK

Unifrax **Australia** Pty. Ltd.
326 Settlement Rd
Thomastown
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Contact Details: See page 12

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2. HAZARDS IDENTIFICATION

Flammability

Fire Hazards: Non flammable

Explosive Hazards: Non explosive

Health Hazards: Irritating to eyes, skin, respiratory system and disturbances to gastro intestines.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredients:	Name	CAS	Proportion
	Ceramic Fibre	65997-17-3	50 - 90%
	Carboxylated Styrene-Butadiene copolymer	PROPRIETARY	2-25%
	Aluminium sulfate	10043-01-3	.30-1%

4. FIRST AID MEASURES

Ingestion Ingestion is unlikely, but if it does occur DO NOT induce vomiting; drink plenty of water. Material should be excreted naturally, but if effects persists seek medical attention.

Eye Flush immediately with large amounts of water for at least 15 minutes, after removing any contact lenses. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes. Seek medical advice as good work hygiene practice in all cases of eye contamination.

Skin If skin becomes irritated, remove contaminated clothing. Wash area of contact thoroughly with soap and water. Do not rub or scratch exposed skin. Using a skin cream or lotion after washing may be helpful. If effects persist seek medical advice.

Inhalation Remove exposed person/s from source of exposure, to fresh air. Keep exposed person/s comfortable, warm and rested. Recovery should be rapid after removal from exposure, but if effects persist seek medical advice.

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4. First Aid Measures cont'd:

First Aid Facilities	Eyewash station and normal washroom facilities must be provided.
Advice to Doctor	Acute effects are essential irritant in nature. Refer to 'OTHER INFORMATION' section for chronic and long-term exposures. Chronic bronchial or lung disease, or bronchial hyperactivity, can be aggravated by exposure to these materials.

5. FIRE FIGHTING MEASURES.

Fire Explosion Hazard:	Not Flammable and not explosive.
Hazardous Reactions/ Decomposition Products	STABILITY/INCOMPATIBILITY: Stable under normal conditions of use. Incompatible with hydrofluoric acid and concentrated alkali.
Hazchem Code:	None Allocated.

6. ACCIDENTAL RELEASE MEASURES

Spills or Release To the Environment	Where possible, use vacuum suction to clean up spilled material. Use dust suppressant where sweeping is necessary. Avoid clean up procedures that may result in water pollution. Personal safety and exposure recommendations described elsewhere in this data sheet apply to exposure during clean up of spilled material.
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7. HANDLING & STORAGE

Handling:	In the installation of <u>unbonded materials</u> , the following handling and installation procedures are recommended: a) All installation practices should be designed to minimise the liberation of any airborne fibre or dust. b) In large installations of several days/weeks duration, the installation area should be clearly designated and barriers
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7. Handling & Storage cont'd:

- erected to limit access.
- c) The Ceramic Materials should be stored in sealed plastic bags or similar containers until installation is to proceed. These containers should only be opened within the designated work area when work is to start.
 - d) Where possible, materials should be delivered in sizes such that a minimum of handling is required. However when cutting or drilling is required, these should be done with hand tools fitted with local exhaust extraction. The exhaust from such extraction equipment should be fitted and positioned away from other work areas.
 - e) Empty storage bags should be folded and stored in a waste container along with any waste material.
 - f) Upon completion of the job, all excess materials should be sealed in bags prior to removal from the designated work area. The work area should be vacuumed using an industrial vacuum cleaner. Wet mopping and wiping can be utilised if an industrial vacuum cleaner is not available.

For removal of Ceramic Fiber materials the following handling procedures are recommended:

- a) All installation practices should be designed to minimise the liberation of any airborne fibre or dust.
- b) In large installations of several days/weeks duration, the installation area should be clearly designated and barriers erected to prevent access.
- c) Upon completion of the job, all excess materials should be sealed in bags prior to removal from the designated work area. The work area should be vacuumed using an industrial vacuum cleaner. Wet mopping and wiping can be utilised if an industrial vacuum cleaner is not available.

For removal of embrittled Ceramic Fiber materials the following procedures, in particular, the selection of respirator protection should be implemented during the removal of such materials.

- a) The removal area should be signposted and contained, where workable, to minimize the transfer of dust to other work areas.
- b) Separate change areas should be provided to minimize the transfer of dust to general work areas.
- c) Where workable, the spent material should be wetted

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7. Handling & Storage cont'd:

- to suppress dust generation.
- d) Waste shall be placed in containers, plastic bags or other methods which prevent Fiber and/or dust emission, and disposed of in accordance with local waste disposal authority requirements.
- e) The removal area should then be cleaned using an Industrial vacuum cleaner and:-
- f) Once visible dust has been cleaned up, containment material should be removed in a manner that minimizes the liberation of any trapped dust.

Storage Precautions: No special storage requirements.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

Exposure No exposure standard has been established by Worksafe Australia (WSA), for this product. WSA however has set exposure standards for the ingredient/s listed above, and 0.5 fibre/ml for synthetic mineral fibre. For situations where most of the airborne material is of non-respirable fibre, a secondary and complementary standard of 2 mg/m³, is applicable to minimise upper respiratory tract irritation, but is NOT to take place over the respirable fibre standard. As established by the National Occupational Health and Safety Commission (Worksafe Australia).

Engineering Controls Where possible use engineering controls such as exhaust ventilation and dust collection devices to reduce airborne fibre levels. Where these are not feasible, or do not reduce airborne concentrations of fibres to below 0.5 fibre/ml, or material has been exposed to greater than 1000°C, where more extensive precautions are required as outlined below in 'Personal Protection'.

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Personal Protection

The Worksafe Australia TWA exposure standard for cristobalite is 0.1mg/m³; OSHA permissible exposure limit (PEL) for cristobalite is 0.05mg/m³ (respirable dust). The ACGIH threshold limit value (TLV) for cristobalite 0.05 1mg/m³ (respirable dust) (ACGIH 1991-1992). Use AS, NIOSH or MSHA approved equipment when airborne limits may be exceeded. Minimal acceptable respirators recommended for given airborne cristobalite concentrations are as follows:

CONCENTRATION: Up to 5 fibres/ml or up to 10 times the OSHA PEL for cristobalite.

RESPIRATOR TYPE: P2 Type, Half-face cartridge respirator with high-efficiency filters. (E.g. 3M 6000 with 2040 filter or equivalent).

CONCENTRATION: Up to 25 fibres/ml or 50 times the OSHA PEL for cristobalite (2.5mg/m³).

RESPIRATOR TYPE: P3 Type, Full-face cartridge respirator with high-efficiency filters. (E.g. 3M 7800S with 7255 filter or equivalent).

CONCENTRATION: Greater than 25 fibres/ml or 50 times the OSHA PEL for cristobalite (2.5mg/m³).

RESPIRATOR TYPE: P3 Type, Full-face cartridge respirator with high-efficiency filters. (E.g. 3M 7800S with W9435 hose and W2806 regulator or equivalent).

If airborne filters or cristobalite concentrations are not known, as minimum protection, use AS, NIOSH or MSHA approved half face, air-purifying respirator with HEPA filter cartridges. Insulation surfaces should be lightly sprayed with water before removal to suppress airborne dust. As water evaporates during removal, additional water should be sprayed on the surfaces as needed. Only enough water should be sprayed to suppress dust so that water does not run onto the floor of the work area. To aid the wetting process, a surfactant may be used. After RCF removal is completed, dust suppressing cleaning methods, such as wet

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8. Exposure Controls & Personal Protection cont'd:

sweeping or vacuuming, should be used to clean the work area. If dry vacuuming is used, the vacuum must be equipped with a HEPA filter. Air blowing or dry sweeping should not be used. Dust suppressing components can be used to clean up light dust.

Eye Protection

Safety glasses with side shields, or chemical goggles must be worn when handling this material. Wear safety glasses or chemical goggles to prevent eye contact. Contact lenses should not be worn unless chemical goggles are also worn and care is taken not to touch the eye with contaminated parts of the body. Have eye-washing facilities readily available where eye contact can occur.

Clothing

Wear gloves, hats or full body clothing to prevent skin as necessary. Use separate lockers for work clothes to prevent fibre transfer to street clothes. Avoid taking unwashed work clothes home or provide disposable work clothing. Wash work clothes separately from other clothing. Rinse washing machine thoroughly after use. If clothing is to be laundered by someone else, inform launderer of proper procedure.

Protective Equipment

The National Code of Practice for the Safe Use of Synthetic Mineral Fibres (NOHSC May 1990) advises that for installation and removal of both bonded and unbonded ceramic fibre material the following personal protective equipment should be used.

- (a) Disposable coveralls or long sleeve, loose fitting clothing and gloves (launderable clothing should be washed separately from other clothing).
- (b) Where overhead work is involved, goggles and head covering should be worn; and
- (c) A half-face respirator (Class P1 or P2) respirator should be worn during work in enclosed or poorly ventilated spaces, for example, in ceiling spaces, or where evidence suggests that respirable fibre levels may exceed 0.5 f/ml.

For ceramic fibre removal work the following personal protective equipment should be used.

- (a) Disposable coveralls or long sleeves, loose fitting clothing and gloves be worn during installation (launderable clothing should be washed separately from other clothing).

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8. Exposure Control & Personal Protection cont'd:

- (b) Where overhead work is involved, goggles and head covering should be worn; and
- (c) A half-face respirator (Class P1 or P2) respirator.

For removal of embrittled or heat effected ceramic materials, the following personal protective equipment should be used by all personnel directly involved in the removal work.

- (a) Disposable coveralls or long sleeve, loose fitting clothing and gloves (launderable clothing should be washed separately from other clothing).
- (b) Where overhead work is involved, goggles or suitable eye protection and head covering should be worn.
- (c) A Class P2 respirator provides the necessary protection factor for this task. However, in some circumstances where excessive levels of dust are created, the limitations of filter loading capacity and facial seal may necessitate the use of:
 - a full (P3) cartridge respirator, or
 - a full (P3) powered air-purifying respirator or
 - a full faced, positive pressure demand airline respirator.

All respiratory protective devices should comply with AS/NZS1715 and AS/NZS1716.

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance	Cream coloured board, with no odour.
Melting Point	Not available
Boiling Point	Not applicable
Vapour Pressure	Not applicable
Specific Gravity	Not available
Flash Point	None
Flamm. Limit LEL	Not applicable
Flamm. Limit UEL	Not applicable
Volatile Component	Not applicable
Solubility in Water	Not available

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OTHER PROPERTIES

Autoignition Temp.	None
Vapour Density	Not applicable
pH Value	Not applicable
Specific Properties or Risk	See 'Health Effects' section
Thermal Decomposition	See 'Hazardous Decomposition or by-products'.
Formula	Not applicable: Mixture
Molecular Weight	Not applicable: Mixture

10. STABILITY & REACTIVITY

Stability: Stable under normal conditions of use.

Hazardous Reactions
Decomposition Products Refer to SAFE HANDLING INFORMATION

11. TOXICOLOGICAL INFORMATION

The potential for SMF fibres to produce health effects has been the subject of extensive investigations over a number of decades. Unifrax is continuing to support the necessary investigations and will make all data available to all interested parties. Information will be updated as studies are completed and reviewed. The following is a review of the results to date:

EPIDEMIOLOGY: Extensive investigations of ceramic fibre production workers have been ongoing for more than 10 years. The preliminary evidence is as follows:

1. There is no evidence of any fibrotic lung disease (interstitial fibrosis) whatsoever on X-ray.
2. There is no evidence of any lung disease among those employees exposed to ceramic fibre that have never smoked.
3. A statistical 'trend' was observed between slight decreases in measures of pulmonary function and the duration of exposure to ceramic fibre however this trend is similar to that observed in smokers who work in other industries. These observations are clinically insignificant and individual results are within the range of values obtained from the normal population.
4. Pleural plaques (thickening along the chest wall) have been observed in a small number of employees in overseas plants who have had long duration of employment. A repeat study

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11. Toxicological Information cont'd:

found inconsistencies in detecting such pleural plaques. No pleural plaques have been found in the Australian manufacturing workforce. There are several occupational and non-occupational causes for pleural plaques and it is generally considered that they are not indications of 'pre-cancer' nor are they associated with any measurable effect on lung function.

TOXICOLOGY: A number of studies have been conducted on the health effects of inhalation exposure of rats and hamsters. In a lifetime (6 hours per day, 5 days a week for 24 months) nose only inhalation study, rats exposed to the Maximum Tolerated Dose (30mg/m³, 200 fibres/ml) developed progressive lung damage (interstitial fibrosis) and cancer of the lung and mesothelioma but no lung cancers. A multiple dose study (3, 9, 16mg/m³; 25, 75 and 150 fibres/ml) found a dose related parenchymal fibrosis however in the lowest exposed group (25 fibres/ml); no irreversible effects were found that could be attributed to ceramic fibre exposure. There was no statistical excess of lung tumours at any dose. One rat developed a mesothelioma in the 75 fibre/ml exposure group.

In 1987 the International Agency for Research on Cancer (IARC) reviewed the epidemiological and animal toxicology data on SMF (including ceramic fibre, glasswool, rockwool, and slagwool) and classified the group as possible human carcinogens (IARC Group 2B).

12. ECOLOGICAL INFORMATION

Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal:

Waste shall be placed in containers, plastic bags or other methods which will prevent Fiber and/or dust emission and disposed of in accordance with the local waste disposal authority requirements. There may be specific regulations at the Local, State or Federal level that pertain to this material.

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14. TRANSPORT INFORMATION

No special transport requirements are necessary. Not defined as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

UN Number	None Allocated
Shipping Name	None Allocated
DG Class	None Allocated
Packaging Group	None Allocated
Hazchem Code	None Allocated
Poisons Schedule	Not Scheduled

15. REGULATORY INFORMATION

Risk Statement: R40 (3) Possible risk of irreversible effects.
R36/37/38 Irritating to eyes, respiratory system and skin.

Safety Statement: S22 Do not breathe dust. S52 Avoid contact with eyes. S38 In insufficient ventilation, wear suitable respiratory equipment. S40. To clean floor and all objects contaminated by this Material, use AS approved HEPA fitted vacuum cleaner. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

Hazard Category: Harmful, irritant.

Poisons Schedule: Not scheduled.

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16. OTHER INFORMATION

RCF DEVITRIFICATION

As produced, all RCG fibers are vitreous (glassy) materials which do not contain crystalline silica. Continued exposure to elevated temperatures may cause these fibers to devitrify (become crystalline). The first crystalline formation (mullite) begins to occur at approximately 985° C (1805° F). Crystalline phase silica may begin to form 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, fiber chemistry and/or the presence of fluxing agents. The presence of crystalline phases can be confirmed only through laboratory analysis of the "hot face" fiber.

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".

IARC and NTP did not evaluate after-service RCF, which may contain various crystalline phases. However, an analysis of after-service RCF samples obtained pursuant to an exposure monitoring agreement with the USEPA, found that in the furnace conditions sampled, most did not contain detectable levels of crystalline silica. Other relevant RCF studies found that (1) simulated after-service RCF showed little, or no, activity where exposure was by inhalation or by intraperitoneal injection; and (2) after-service RCF was not cytotoxic to macrophage-like cells at concentrations up to 320 g/cm² - by comparison, pure quartz or cristobalite were significantly active at much lower levels (circa 20 g/cm²).

CONTACT DETAILS:

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References: Replaces MSDS dated 30 June 2006.

NOTICE: *The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorisation given or implied to practise any patented invention without licence. In addition, no responsibility can be assumed by the vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.*

.....End of Report.....

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