Unifrax Australia Pty. Ltd.
326 Settlement Road
Thomastown, VIC 3074
ACN 093 625 757
Ph: (03) 9463 0000 Fax: (03) 9464 1176

RIGIFRAX

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION OF MATERIAL & SUPPLIER

Brand Name: Rigifrax

Product Names: Rigifrax Launder

Synonyms: Man-made Mineral Fibre (MMMF)

CAS Number: None Allocated
UN Number: None Allocated
DG Class None Allocated
Packaging Group None Allocated
Hazchem Code None Allocated
Poisons Schedule Not Scheduled
Recommended Uses Thermal insulating for molten metal distribution / transfer

Supplier: Unifrax Australia Pty Ltd

Contact: See page 9.

2. HAZARDS IDENTIFICATION

Flammability
Fire Hazards: Non flammable
Explosive Hazards: Non explosive
Health Hazards: May cause irritation to eyes, skin, respiratory system and disturbances to gastro intestines.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

	Name	CAS	Proportion (wt%)
	Rigifrax		
Ingredients:	Synthetic mineral Fibre*	436-083-99-7	90
	Unimin Wollastonite	1393-17-0	0-10

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3. Composition & Information on Ingredients cont'd:

* Synthetic mineral fibre containing Calcium Magnesium silicate ($CaMgSi_2O_6$) 30-60% + Colloidal Silica (SiO_2) 0-55% + Aluminium Oxide (Al_2O_3) 0-12%.

Other Information: The biosoluble mineral fibres used in this product are not classified by the International Agency for Research on Cancer (IARC) as being carcinogenic.

4. FIRST AID MEASURES

Ingestion:	Do not induce vomiting. Drink plenty of water..
Eye:	Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held open away from the eyeball to ensure thorough rinsing. Do not rub eyes.
Skin:	If skin becomes irritated, remove contaminated clothing. Wash areas of contact with soap and water. Do not rub or scratch exposed skin. Using a skin cream or lotion after washing may be helpful in reducing irritation.
Inhalation:	Remove exposed person/s from source of exposure to fresh air.
Respiratory Irritation:	If respiratory tract irritation develops, move the person to a dust free location, get them to drink water and blow their nose. Seek medical attention if the irritation continues. Refer to Section 8 for additional measures to reduce or eliminate exposure.
ADVICE TO DOCTOR:	Skin and respiratory effects are the result of temporary, mild mechanical irritation. Treat symptomatically.

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5. FIRE FIGHTING MEASURES.

Fire Explosion Hazard: Not Flammable and not explosive.

Hazardous Reactions/ Decomposition Products Refer to SAFE HANDLING INFORMATION

Hazchem Code: None Allocated.

6. ACCIDENTAL RELEASE MEASURES

Spills or Release To the Environment

Collect or gather spilled product mechanically and transfer to appropriate container for disposal. Do not flush material down drains and prevent entry to waterways.
Avoid the generation of dusts during clean-up and do not allow material to become windblown. 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 HEPA filter. Compressed air or dry sweeping should not be used for cleaning.
Refer to Section 8 below for clean-up of spilled product.

Dispose of the product as waste according to Section 13.

7. HANDLING & STORAGE

Handling

- Avoid unnecessary handling of product
- Dispose of scrap material and debris in suitable containers
- Ensure good general ventilation
- Local exhaust ventilation may be required if the method of use produces dust levels in excess of the maximum exposure limits.

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7. Handling & Storage cont'd:

Storage

- Store the product in original packaging when not in use
- Avoid damaging the original packing material
- Empty packaging may contain residue and should not be reused.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

National Exposure Standards
No exposure standard has been established for this product by NOHSC, however National Exposure Standards for certain ingredients are shown below:

Ingredient	TWA Fibres/ml	TWA (mg/m^3)
Synthetic Mineral Fibre	0.5	2 (inhalable dust)

Note: No exposure standard exists for biosoluble respirable fibres so the exposure standard of 0.5 fibres/ml for all forms of synthetic mineral fibres has been applied. For situations where almost all of the airborne material is fibrous, a secondary, yet complementary, Exposure Standard of 2 mg/m^3 of inhalable dust is applicable to minimise upper respiratory tract irritation. This dust standard is not to take precedence over the respirable fibre standard of 0.5 fibres/ml.

Engineering Control Measures

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 dust emissions.

Exposure levels should be kept below NOHSC Guidelines, if this is not possible then more extensive precautions are required as outlined below in "Personal Protective Equipment".

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8. Exposure Controls & Personal Protection cont'd:

Eye wash facilities are recommended in areas where eye contact is considered a potential hazard.

Personal Protective Equipment

Respiratory protection:	When engineering and/or administrative controls are insufficient to maintain workplace concentrations below the NOHSC TWA Exposure Standards, the use of appropriate respiratory protection, conforming to AS/NZS 1716 and 1715, is recommended. The evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed, on a case by case basis, by a qualified Occupational Hygienist.
Eye/Face protection:	Wear goggles or safety glasses with side shields 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 eyewashing facilities readily available where eye irritation can occur.
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.).

Additional Precautions for Thermally Stressed Materials

When the product has been exposed to temperatures greater than 900°C for sustained periods, the amorphous silicate in the mineral fibres begins to transform to mixtures of crystalline phases including cristobalite, a form of crystalline silica. The occurrence and extent of crystalline phase formation is dependent on the duration and temperature of

exposure and the reaction occurs at the "hot face" of the product. The presence of cristobalite can be confirmed only through laboratory analysis.

8. Exposure Controls & Personal Protection cont'd:

The National Exposure Standard for cristobalite is 0.1 mg/m^3 TWA (Interim). The International Agency for Research on Cancer (IARC) has classified crystalline silica inhaled in the form of quartz or cristobalite, as a Group 1 "Established human carcinogen".

For the removal of thermally stressed or embrittled product likely to contain cristobalite or if removal is being conducted in a poorly ventilated or enclosed space, the following Personal Protective Equipment is recommended:

Eye/Face protection: Wear goggles or safety glasses with side shields and head covering.

Skin protection: Wear disposable coveralls or long sleeve, loose fitting clothing and gloves. Clothing should be washed separately from other clothing to avoid cross-contamination.

Respiratory protection: Wear a Class P2 half face respirator (conforming to AS/NZS 1716 and 1715). 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-face (Class P3) cartridge respirator; or
- A full-face (Class P3) powered air-purifying respirator; or
- A full-face, positive pressure, demand airline respirator

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance:	White Solid
Odour:	None
Melting Point:	>1500℃
Vapour Pressure:	Not applicable.
Flash Point:	Not applicable.
Solubility in Water:	Insoluble in water
Density:	1300 Kg/m^3

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PH: Not applicable

10. STABILITY & REACTIVITY

Chemical stability: Stable under conditions of normal use.

Conditions to avoid: None

Incompatible materials: Incompatible with hydrofluoric acid, phosphoric acid and concentrated alkalis

Hazardous decomposition products: When the product has been exposed to temperatures greater than 900^{o}C for sustained periods the amorphous silicate in the mineral fibres begins to transform to mixtures of crystalline phases including cristobalite, a form of crystalline silica. Refer to section 8, above, for further information regarding thermally stressed materials.

11. TOXICOLOGICAL INFORMATION

No epidemiological or toxicological studies are available for this product. Animal studies based on chemically similar fibres using lifetime nose-only inhalation showed no fibrosis or significant increase in lung tumours in exposed animals.

12. ECOLOGICAL INFORMATION

The predominantly natural mineral components of this product are sluggish in reaction and environmentally stable.

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13. 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

Waste should be placed in containers, plastic bags or other methods which prevent fibre 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.

14. TRANSPORT INFORMATION

This product is not classified as dangerous good by the criteria of the Australian Code for the Transport of Dangerous Goods by Road and Rail.

15. REGULATORY INFORMATION

The biosoluble mineral fibres used in this product are not classified by the IARC as being carcinogenic.

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

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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

16. Other Information cont'd:

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:

Contact:	During Business Hours	Ph: +61 3 9463 0000
Customer Service Toll Free:		Ph: 1300 797 888
Emergency / After Hours Contact		Alan Smith
		Ph: 0409 288 916

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References: Replaces MSDS dated 27 March 2007.

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 ...