Unifrax Australia Pty. Ltd.
336 Settlement Road
Thomastown, VIC 3074
ACN 093 625 757
Ph: (03) 9463 7100 Fax: (03) 9464 5472

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION OF MATERIAL & SUPPLIER

Brand Name:	Fiberfrax®
Ship. Name (CSN)	None Allocated
Name	LDS Moldable
Other Names	Moldable LS Fiberfrax® LDS Moldable Fiberfrax® LDS Moldable AL Fiberfrax® LDS 1400 Moldable
UN Number	None Allocated
DG Class	None Allocated
Packaging Group	None Allocated
Hazchem Code	None Allocated
Poisons Schedule	Not Scheduled
Product Use	High Temperature putty
Supplier:	Unifrax Australia Pty. Ltd.
Contact Details:	See Page 11

2. HAZARDS IDENTIFICATION

Flammability Fire Hazards:	Non Flammable
Explosive Hazards:	Non Explosive
Health Hazards:	Possible irritation to eyes, skin, respiratory system and disturbances to Gastro intestines.

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3. COMPOSITION AND INFORMATION ON INGREDIENTS

Name	CAS	Proportion
Colloidal silica (amorphous)	7631-86-9	50-65%
Ceramic Fibre	65997-17-3	20-45%
Fumed Silica	112945-52-5	1-15%
Other ingredients determined not to be hazardous		1-10%

4. FIRST AID MEASURES

Ingestion

Ingestion is unlikely. If ingested, DO NOT induce vomiting. The preferred method of elimination is through dilution and natural gastrointestinal elimination. Drink extra water or milk. Get medical attention if gastrointestinal symptoms develop, for example, irritation, nausea, vomiting, abdominal pain and diarrhea. If spontaneous vomiting occurs monitor breathing difficulty.

Eye

Flush immediately with large amounts of water for at least 15 minutes. Any contact lenses should be removed, and eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes. Get medical attention as good work hygiene practice in all cases of eye exposure, and especially if effects persist.

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. Get medical attention if irritation persists. Launder contaminated clothing separately.

Inhalation

Remove exposed person/s from source of exposure, to fresh air. Some people may be sensitive to a fibre induced irritation of the respiratory tract. If symptoms such as

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4. First Aid Measures cont'd:

	shortness of breath, coughing, wheezing or chest pain develops, seek medical attention. If person experiences continued breathing difficulties, competent first-aid personnel can administer oxygen until medical assistance can be rendered.
First Aid Facilities	Eyewash station and normal washroom facilities must be provided, and a safety shower is strongly recommended.
Advice to Doctor	Pre-existing medical conditions may be aggravated by exposure, specifically, bronchial hyper-activity and chronic bronchial or lung disease. Persons chronically exposed to Aluminosilicate should be periodically monitored with chest X-rays and pulmonary function testing. Granulomatous skin reactions may occur if material gains entry to open wounds.

5. FIRE FIGHTING MEASURES.

Fire Explosion Hazard:	Not Flammable and not explosive.
Hazardous Combustion Product:	Thermal decomposition of the binder from fires may release hydrocarbons, including small amounts of formaldehyde and oxides of carbon. Oxides of silica may also be formed at extreme temperatures. Adequate respiratory and other protection must used.
Extinguishing Media	Use extinguishing agent suitable for surrounding fire.
Hazardous Reaction	Stable under normal conditions of use
Hazchem Code:	None Allocated.

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6. ACCIDENTAL RELEASE MEASURES

Where possible, use HEPA fitted 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.

7. HANDLING & STORAGE

Safe Handling:

The toxicology data indicates that ceramic fibre should be handled with caution. The handling practices described in this MSDS must be strictly followed. In particular, when handling refractory ceramic fibre in any application, special caution should be taken to avoid unnecessary cutting and tearing of the material to minimise the generation of airborne dusts. Product which has been in service at temperatures above 1000°C, may undergo partial conversion to cristobalite, a form of crystalline silica. This reaction occurs at the furnace lining hot face. As a consequence, this material becomes more friable; special caution must be taken to minimise generation of airborne dust. The amount of cristobalite present will depend on the temperature and length in service.

If airborne fibre or cristobalite concentrations are not known, as minimum protection, use AS1715/1716 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 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

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7. Handling & Storage cont'd:

sweeping should not be used. Dust suppressing components can be used to clean up light dust.

Storage Precautions: No special storage requirements

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

Exposure Limits Ceramic Fibre: 0.5 fibre/ml.

Other Exposure Info. As established by the National Occupational Health and Safety Commission (Worksafe Australia). The Worksafe Australia exposure limit (TWA) for cristobalite is 0.1mg/m^3 (respirable dust). (See 'Handling' and ' Respiratory' protection section(s)

Engineering Controls Use adequate ventilation to keep the airborne concentrations of this material below the Worksafe Australia exposure standard. Local ventilation and/or enclosure of the process are preferred in these cases.

The following personal protective guidelines should be followed, especially where engineering controls (eg. mechanical dust collection and other means of exhaust ventilation) are not technically feasible or do not reduce airborne fibre concentrations to below 0.5 fibre/ml. However, when the material has been exposed to temperatures greater than 1000℃, more extensive precautions are required as outlined below in 'Personal Protection Respiratory' section.

PERSONAL PROTECTION

Respiratory Type (AS1716) Respiratory equipment that conforms to AS1715/1716 must be used, where exposure to material is likely to

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8. Exposure Controls & Personal Protection cont'd:

or approach exposure standards. If airborne exposure limits are exceeded and engineering controls are not feasible, respiratory protection (as described below) must be used. Respiratory protection must also be used if irritation is experienced, of if airborne limits are unknown. If the material has been exposed to temperatures above 1000℃ refer to below

CONCENTRATION: Up to 5 fibres/ml

RESPIRATOR TYPE: The optional disposable dust respirator (eg. 9970 or equivalent).

CONCENTRATION: 0.5 to 5 fibres/ml

RESPIRATOR TYPE: Half-face, air purifying respirator equipped with a high efficiency particulate air (HEPA) filter cartridges (eg. 3M 6000S with 2040 filter or equivalent).

CONCENTRATION: 5 to 25 fibres/ml

RESPIRATOR TYPE: Full-face, air purifying respirator with high efficiency particulate air (HEPA) filter cartridges (eg. 3M 7800S with respirator (PAPR) equipped with HEPA filter cartridges (eg. 3M W3265S with W3267 filters or equivalent).

CONCENTRATION: >25 fibres/ml

RESPIRATOR TYPE: Full-face, positive pressure supplied air purifying respirator (eg. 3M 7800S with W9435 hose and W2806 low pressure regulator kit or equivalent).

If airborne fibre levels are not known, as minimum protection, use half mask air purifying respirator equipped with high efficiency particulate air (HEPA) filter cartridges (eg. 6000 series or equivalent). If respiratory protection is

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8. Exposure Controls & Personal Protection cont'd:

	used, employees must be given instructions and training on their correct use.
Eye Protection	Safety glasses with side shields, or chemical goggles must be worn when handling this material. 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.
Glove Type	Wear gloves, hats or full body clothing to prevent skin contact as necessary.
Clothing	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.
Work/Hygienic Handling Practices	Good work hygiene practice must be followed when this substance; that is, always wash face and hands before eating, drinking, smoking, toilet breaks and at the end of shifts. Do not take contaminated clothing home.

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance	White Putty with no odour
Melting Point	Not available
Boiling Point	Not available
Vapor Pressure	Not available
Specific Gravity	Not available
Flash Point	Not applicable
Flamm. Limit LEL	Not applicable

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9. Physical & Chemical Properties cont'd:

Flamm. Limit UEL	Not applicable
Solubility in Water	<1G/L in water

OTHER PROPERTIES

Auto ignition Temp.	None
Vapor Density	Not applicable
pH Value	<8.5 (saturated solution in water)
Viscosity	Not applicable
Haz. Polymerization	None
Materials to Avoid	Incompatible with hydrofluoric acid, phosphoric acid and concentrated alkalis.
Formula	Not applicable: Mixture
Molecular Weight	Not applicable: Mixture
Other Information	Pour Point: Not applicable

10. STABILITY & REACTIVITY

Stability:	Stable under normal conditions of use. Incompatible with hydrofluoric acid and concentrated alkali
Hazardous Reactions/ Decomposition Products	Refer to SAFE HANDLING INFORMATION

11. TOXICOLOGICAL INFORMATION

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/m^3, 200 Fibers/ml) developed progressive lung damage (interstitial fibrosis) and cancer of the lung and mesothelioma. In contrast, Hamsters similarly exposed developed interstitial fibrosis and mesothelioma but no lung cancers. A multiple dose study (3, 9, 16mg/m^3; 25, 75 and 150 Fibers/ml) found a dose related parenchymal fibrosis however in the

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11. Toxicological Information cont'd:

lowest exposed group (25 Fibers/ml); no irreversible effects were found that could be attributed to ceramic Fiber exposure. There was no statistical excess of lung tumours at any dose. One rat developed a mesothelioma in the 75 Fiber/ml exposure group.
In 1987 the International Agency for Research on Cancer (IARC) reviewed the epidemiological and animal toxicology data on SMF (including ceramic Fiber, glasswool, rockwool, and slagwool) and classified the group as possible human carcinogens (IARC Group 2B)

12. ECOLOGICAL INFORMATION

Conformance to specific local, state and federal regulations may be required for this material.

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

14. TRANSPORT INFORMATION

No special transport requirements are necessary.

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

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15. REGULATORY INFORMATION

Risk Statement	R40 Possible risk of irreversible effects. R36/37/38 Irritating to eyes, respiratory system and skin.
Safety Statement	S22 Do not breathe dust. S28 After contact with skin, wash immediately with plenty of soap and water. S38 If insufficient ventilation, wear suitable respiratory equipment. S40 To clean floor and all objects contaminated by this material, use HEPA fitted vacuum cleaner. S20/21 When using, do not eat, drink or smoke. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
Hazard Category	Harmful, Irritant

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”.

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16. Other Information cont'd:

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 intra-peritoneal injection; and (2) after-service RCF was not cytotoxic to macrophage-like cells at concentrations up to 320mg/cm² - by comparison, pure quartz or cristobalite were significantly active at much lower levels (circa 20m g/cm²).

CONTACT DETAILS:

Contact:	During Business Hours	Ph: +61 3 9463 7100
Emergency / After Hours Contact:		Peter Willoughby Ph: 0409 288 917

References: Replaces MSDS dated 19 March 2012.

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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.*

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