

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION OF MATERIAL & SUPPLIER

| | |
|--------------------------|---|
| Brand Name: | FIBERFRAX® |
| Name: | GC90 |
| Other Names: | Alform |
| UN Number: | None |
| DG Class: | None |
| Packaging Group: | None |
| Hazchem Code: | None |
| Poisons Schedule: | None |
| Product Use: | Thermal insulating for non-ferrous metal casting. |
| Supplier: | Unifrax Australia Pty. Ltd. |
| Contact Details: | See Page 11. |

2. HAZARDS IDENTIFICATION

| | |
|--------------------------------|---|
| Flammability | |
| Fire/Explosion Hazards: | Non flammable. Material is not combustible for practical purposes. |
| Hazardous Reaction: | Stable under normal conditions of use. |
| Health Hazards: | May cause irritation 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 | 30-60% |
| | Colloidal Silica | 7631-86-9 | 0-54.99% |
| | Aluminium oxide | 1344-28-1 | 0-11.99% |
| | Other ingredients determined not to be hazardous | Mixture | |
| | Fumed Silica | | 0-9.99% |
| | Calcium oxide | 1305-78-8 | 0-7.99% |

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

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. Seek medical attention if gastrointestinal symptoms develop, e.g. irritation, nausea, vomiting, abdominal pain and diarrhea. If spontaneous vomiting occurs monitor breathing difficulty. |
| Eye: | Flush immediately with large amounts of water. Do not rub eyes. |
| 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. If symptoms such as shortness of breath, coughing, wheezing or chest pain develop, seek medical attention. If person experiences continued breathing difficulties, component first-aid personnel can administer oxygen until medical assistance can be rendered. |
| 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. See 'Toxicology' Section. |

5. FIRE FIGHTING MEASURES.

| | |
|--------------------------------------|--|
| Fire Explosion Hazard: | Not Flammable and not explosive. |
| Hazardous Combustion Products | None |
| Extinguishing Media: | Use extinguishing agent suitable for surrounding fire. |
| Hazchem Code: | None Allocated. |

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

6. ACCIDENTAL RELEASE MEASURES

| | |
|-------------------------|--|
| Spills and Leaks | 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 'Personal Protection' section of this data sheet apply to exposure during clean up of spilled material. |
| Disposal | Waste shall be placed in containers, plastic bags or other methods which will prevent fibre and/or dust emission, and disposed of in accordance with all local, state and federal waste disposal authority requirements that pertain to this material. |

7. HANDLING & STORAGE

| | |
|-----------------------------|---|
| Storage Precautions: | No special storage or transport requirements are necessary. |
| Transport | This product is not classified as a dangerous good in the Australian Dangerous Goods Code by reference to a specific substance name or a generic substance name or group. |
| Handling | <p>Use AS1715/1716 approved respirators, when airborne limits may be exceeded. Minimal acceptable respirators recommended for given airborne cristobalite concentrations are given in 'Personal Protection' section.</p> <p>If airborne fibre or cristobalite or other silica concentration are not known, as minimum protection, use AS1715/1716 approved half face or, air purifying respirator with HEPA, P1 filter cartridges. Dust suppression practices such as wet process cutting, drilling, etc. and built in dust extraction should be employed. Appropriately designed tools must be used; (for example non-electrical tools and wet cutting blades only, and sufficient dust extraction mechanisms, etc. 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</p> |

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

7. Handling & Storage cont'd:

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 sweeping should not be used. Dust suppressing components can be used to clean up light dust. In the installation of unbonded materials, 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 erected to prevent 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 and machining 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 other waste material.
- (f) Upon completion of the job, all excess material 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 fibre materials the following handling procedures are recommended:

- (a) All 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 material should be
-

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

7. Handling & Storage cont'd:

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 fibre 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 minimise the transfer of dust to other work areas.
- (b) Separate change areas should be provided to minimise the transfer of dust to general work areas;
- (c) Where workable, the spent material should be wetted to suppress dust generation;
- (d) Waste shall be placed in containers, plastic bags or other methods which prevent fibre 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 minimises the liberation of any trapped dust.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

| Exposure Limits: | NAME | TWA | | STEL | | Footnote |
|------------------|-----------------|-------------------|-----|-------------------|-----|----------|
| | | mg/m ³ | ppm | mg/m ³ | ppm | |
| | Aluminium oxide | - | - | 10 | - | |
| | Calcium oxide | - | - | 2 | - | |

Other Exposure Info. Worksafe Australia has established no exposure standard for this product. However exposure standards do exist for the ingredients listed previously and below;

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

8. Exposure Controls & Personal Protection cont'd:

Fumed Silica: 2 mg/m³ (Respirable Fraction)
Ceramic Fibre (SMF) 0.5 fibre/ml.

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: 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 is preferred in these cases. The following personal protective guidelines should be followed, especially where engineering controls (e.g. mechanical dust collection and other means of exhaust concentrations to below 0.5 fibre/ml, (respirable), or 2 mg/m³ non-respirable fibre. However when the material has been exposed to temperatures above 1000°C, more extensive precautions are required as outlined in the '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 exceed 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, or if airborne limits are unknown. If the material has been exposed to temperatures above 1000°C, refer to below.

CONCENTRATION: Up to 5 fibres/ml

RESPIRATOR TYPE: Optional disposable dust respirator (3M 9970 or equivalent).

CONCENTRATION: 0.5 to 5 fibres/ml.

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

8. Exposure Controls & Personal Protection cont'd:

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

CONCENTRATION: 5 to 25 fibres/ml.

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

CONCENTRATION: >25 fibres/ml.

RESPIRATOR TYPE: Full-face, positive-pressure supplied air respirator (e.g. 3M 7800S with W2806 low pressure regulator kit or equivalent).

If airborne filter levels are not known, as minimum protection, use half mask air purifying respirator with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 series or equivalent). If respiratory protection is 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. 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.

Glove Type

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

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

8. Exposure Controls & Personal Protection cont'd:

clothing. Rinse washing machine thoroughly after use. If clothing is to be laundered by someone else, inform launderer of proper procedure.

Work/Hygienic Practices

Good work hygiene practice must be followed when handling 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.

Requirements Concerning Special Training

Refer to 'Respiratory Protection' section on respiratory training.

9. PHYSICAL & CHEMICAL PROPERTIES

| | |
|----------------------------|----------------|
| Appearance: | Solid Material |
| Melting | >1760°C |
| Boiling Point | Not available |
| Vapour Pressure | Not applicable |
| Specific Gravity | 1.30 |
| Flash Point | Not applicable |
| Flamm. Limit LEL | Not applicable |
| Flamm. Limit UEL | Not applicable |
| Solubility in Water | Insoluble |

OTHER PROPERTIES

| | |
|----------------------------|---|
| Auto ignition Temp. | None |
| Vapour Density | Not applicable |
| pH Value | Not applicable |
| Viscosity | Not applicable |
| Haz. Polymerisation | None |
| Materials to Avoid | Incompatible with hydrofluoric acid, phosphoric acid and concentrated alkalis |
| Formula | Not applicable: Mixture |
| Molecular Weight | Not applicable: Mixture |

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

10. STABILITY & REACTIVITY

Stability: Stable under normal conditions of use.

Hazardous Reactions Refer to SAFE HANDLING INFORMATION
Decomposition Products

11. TOXICOLOGICAL INFORMATION

A number of studies on the health effects of inhalation exposure of rats and hamsters are now reaching completion. In a lifetime 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 of the pleura (lining of the chest wall and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma. The multiple dose study (3, 9, 16mg/m³; 25, 75 and 150 fibres/ml) is currently ongoing in rats. After 24 months of exposure, only reversible cellular changes have been seen in the low dose group. At 9 mg/m³ (75 fibre/ml), areas of lung fibrosis are barely discernible and at 16 mg/m³ (150 fibres/ml) both lung and pleural fibrosis are present. At this time, no lung or pleural cancer has been seen in the multiple dose study. This information will be updated once the study is completed.

In 1987, the International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man made vitreous fibres (including ceramic fibre, glasswool, rockwool, and slagwool). The IARC classified ceramic fibre, fibrous glasswool and mineral wool (rockwool and slagwool) as possible human carcinogens. (IARC Group 2B, Worksafe Australia Category 3). This Product was invented in 1992; no epidemiological or toxicological studies are available. Studies based on chemically similar fibre using lifetime nose only inhalation, showed no fibrosis or significant increase in lung tumours in exposed animals. In addition, lifetime studies with fiberglass show no irreversible effects.

As available, animal study results with Insulfrax fibre will be presented.

12. ECOLOGICAL INFORMATION

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

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

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 |

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. 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. |
| Poisons Schedule: | Not scheduled. |

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

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:

Contact: During Business Hours Ph: +61 3 9463 7100

Emergency / After Hours Contact: Alan Smith
Ph: 0409 288 916

Unifrax Australia Pty. Ltd.

326 Settlement Road
Thomastown, VIC 3074

ACN 093 625 757



FIBERFRAX® GC90

Ph: (03) 9463 7100 Fax: (03) 9464 5472

MATERIAL SAFETY DATA SHEET

Classified as Hazardous according to criteria of Worksafe Australia

References: Replaces MSDS dated 01 August 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 ...

Authorised by: Alan Smith
Version: 1.4
Control Status: Controlled Document
Created on: 01/05/10