

**CERAFIBER, CERABLANKET, CERACHROME FIBER,
CERACHROME BLANKET, CERACHEM FIBER, CERACHEM BLANKET,
ENFIL HP, ENFIL Z, KAOWOOL FIBRE, KAOWOOL BLANKET
and corresponding strip and die cut
STANDARD (1260°C) and ZIRCONIA (1425°C)**

**PYROBLOC H, PYROBLOC R, PYROBLOC Y, SABER BLOC,
PYRO-LOG H, PYRO-LOG R, ULTRAFELT, Z-BLOK,
THERMO-BLOC MODULE**

**TEKNOBLANKET FBK 1260/1450, TEKNOBLOK FBK 1260/1450,
TEKNOWOOL FBK 1260/1450
and corresponding strip and die cut
BULK FIBRES: L-2, L-2/1, L-3 and L-3/1
BLANKETS: MT2 and MT3**

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1. IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

IDENTIFICATION OF THE PRODUCT

The above mentioned products contain Refractory Ceramic fibre (RCF) (Aluminosilicate glass wools for high temperature use).

USE OF PRODUCT

Restricted to professional users for application as thermal insulation, heat shields, heat containment, gaskets and expansion joints at temperatures up to 1450°C in industrial furnaces, ovens, kilns, boilers and other process equipment and in the aerospace, automotive and appliance industries, and as passive fire protection systems and firestops.

IDENTIFICATION OF THE COMPANY

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2. COMPOSITION / INFORMATION ON INGREDIENTS

DESCRIPTION

These products in the form of bulk, blanket (pre-sized or not), felt, strip, die-cut and module, bloc, log (encapsulated or not) are made of refractory ceramic fibres.

COMPOSITION

COMPONENT	%	CAS NUMBER	SYMBOL	R PHRASES
Refractory Ceramic Fibre	100	142 844-00-6	T, Xi	R49, R38

Chemical composition of refractory ceramic fibres:

SiO₂: 48-60 %, Al₂O₃: 25-55 %, ZrO₂ < 16%, Cr₂O₃ < 3 %.

None of the components are radioactive under the terms of European Directive Euratom 96/29.

3. HAZARDS IDENTIFICATION

IRRITANT EFFECTS

Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure. These effects are usually temporary.

Pre-existing skin and respiratory conditions including dermatitis, asthma or chronic lung disease might be aggravated by exposure.

CHRONIC RESPIRATORY HEALTH EFFECTS

Refractory ceramic fibres have been classified by the E.U. as a category 2 carcinogen ("substances which should be regarded as if they are carcinogenic to man").

The International Agency for Research on Cancer (IARC) reaffirmed that group 2B ("possibly carcinogenic to humans") remains the appropriate classification for RCF.

4. FIRST-AID MEASURES

SKIN:

In case of skin irritation 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.

5. FIRE-FIGHTING MEASURES

Non combustible products. Class of reaction to fire: 0.

Packaging and surrounding materials may be combustible.

Use extinguishing agent suitable for surrounding combustible materials.

6. ACCIDENTAL RELEASE MEASURES

Where abnormally high dust concentrations occur, provide the workers with appropriate protective equipment as detailed in section 8.

Restrict access to the area to a minimum number of workers required.

Restore the situation to normal as quickly as possible.

Prevent further dust dispersion for example by damping the materials.

Pick up large pieces and use a vacuum cleaner fitted with high efficiency filter (HEPA).

If brushing is used, ensure that the area is wetted down first.

Do not use compressed air for clean up.

Do not allow being wind blown. Do not flush spillage to drain and prevent from entering natural watercourses.

For wastes disposal refer to section 13.

7. HANDLING AND STORAGE

HANDLING/TECHNIQUES TO REDUCE DUST EMISSIONS DURING HANDLING

Handling can be a source of dust emission. The process or processes should be designed to limit the amount of handling. Wherever possible handling should be carried out under ventilation with filtered exhaust. Regular good housekeeping will minimise secondary dust dispersal.

STORAGE

Store in original packaging in a dry area. Always use sealed and clearly labelled containers. Avoid damaging containers. Reduce dust emission during unpacking. Emptied containers, which may contain debris, should be cleaned before disposal or recycling.

SPECIFIC USE

Please refer to your local Thermal Ceramics' supplier or ECFIA's website.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

HYGIENE STANDARDS AND EXPOSURE LIMITS

Industrial hygiene standards and occupational exposure limits vary between countries and local jurisdictions. Check which exposure levels apply to your facility and comply with local regulations. If no regulatory dust or other standards apply, a qualified industrial hygienist can assist with a specific workplace evaluation including recommendations for respiratory protection. Examples of exposure limits (in January 2003) in different countries are given below:

COUNTRY	EXPOSURE LIMIT*	SOURCE
France	0.6 f/ml	Circulaire DRT No 95-4 du 12.01.95
U.K.	1.0 f/ml and 5 mg/m ³	HSE - EH40

* Time weighted average concentrations of airborne respirable ceramic fibres measured over 8 hours by the conventional membrane filter method or the total inhalable dust using standard gravimetric techniques.

ENGINEERING CONTROLS

Review your RCF applications and assess situations with the potential for dust release.

Where practical enclose dust sources and provide dust extraction at source.

If exposure cannot be avoided, local exhaust ventilation can be used which collects dust at source. For example: down draft tables, emission controlling tools and materials handling equipment.

Delimit RCF work areas and restrict access to informed and trained workers.

Use operating procedures, which will limit dust production and exposure of workers.

Keep the workplace clean. Use a vacuum cleaner fitted with a HEPA filter; avoid brushing and compressed air.

If necessary consult an industrial hygienist to design proper workplace controls.

Using products specially tailored to your application(s) will help controlling dust. Some products can be delivered ready for use to avoid further cutting or machining. Some could be treated or packaged to minimise or avoid dust emission during handling. Consult your local Thermal Ceramics' supplier for further details.

PERSONAL PROTECTIVE EQUIPMENT

Skin protection:

Wear gloves and work clothes, which are loose fitting at the neck and wrists. Soiled clothes should be cleaned to remove excess fibres before being taken off (e.g. use vacuum cleaning, not compressed air). Each worker should be provided with two lockers in an appropriate changing and washing area. Work clothes should be washed separately by employer and should not be taken home.

Eye protection:

As necessary wear goggles or safety glasses with side shields.

Respiratory protection:

For dust concentrations below the exposure limit value, RPE is not required but FFP2 respirators may be used on a voluntary basis.

For short-term operations where excursions are less than ten times the limit value use FFP3 respirators.

In case of higher concentrations or where the concentration is not known, please seek advice from your company and/or local Thermal Ceramics' supplier. You may also refer to the ECFIA code of practice available on the ECFIA's website.

INFORMATION AND TRAINING OF WORKERS:

This should include:

- the applications involving fibre-containing products;
- the potential risks to health resulting from the exposure to fibrous dust;
- the requirements regarding smoking, eating and drinking at the workplace;
- the requirements for protective equipment and clothing;
- the good working practices to limit dust emissions;
- the proper use of protective equipment.

ENVIRONMENTAL EXPOSURE CONTROLS:

Refer to local, national or European applicable environmental standards for release to air, water and soil. *For waste, refer to Section 13.*

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	White fibre/blanket	PARTITION COEFFICIENT	N.A.
BOILING POINT	N.A.	ODOUR	None
FLASH POINT	N.A.	MELTING POINT	> 1650° C
AUTOFLAMMABILITY	N.A.	FLAMMABILITY	N.A.
OXIDISING PROPERTIES	N.A.	EXPLOSIVE PROPERTIES	N.A.
BULK DENSITY	50-240 kg/m ³	VAPOUR PRESSURE	N.A.
SOLUBILITY	Slight	pH	N.A.
LENGTH WEIGHTED GEOMETRIC MEAN DIAMETER			> 1.5 µm

10. STABILITY AND REACTIVITY**CONDITIONS OR MATERIALS TO AVOID**

None

DECOMPOSITION PRODUCTS

Upon heating above 900°C for sustained periods, this amorphous material begins to transform to mixtures of crystalline phases. For further information please refer to Section 16.

11. TOXICOLOGICAL INFORMATION**HUMAN DATA****Irritant properties**

RCF is negative when tested using approved methods (Directive 67/548/EEC, Annex 5, Method B4). All man made mineral fibres, like some natural fibres, can produce a mild irritation resulting in itching or rarely, in some sensitive individuals, in a slight reddening. Unlike other irritant reactions this is not the result of allergy or chemical skin damage but is caused by a temporary mechanical effects.

Respiratory health effects

No known disease associated with exposure to RCF even though these fibres have been used for more than 40 years. Pulmonary morbidity studies were carried out among the production workers in Europe and USA.

In the American study pleural plaques were reported in 2.9 % of workers examined. Plaques do not cause any symptoms and do not develop into disease.

DATA FROM ANIMAL EXPERIMENTS

In order to prepare samples for testing in animals, RCF wools must be ground and suitably sized fibres separated. This process and its potential impact on the experimental findings have not been fully understood until quite recently. As such, in early animal experiments tumours were produced after intrapleural and intra peritoneal injections although inhalation experiments were inconclusive. A series of experiments were designed to overcome the shortcomings of these early attempts and in these, the so-called RCC studies, RCFs produced fibrosis and significant numbers of tumours including some mesotheliomas.

However this was only found at the highest exposures used. It is now known that due to the method used to prepare the samples, these exposures included a large number of non-fibrous particles are not typical of any human exposure and that the dose of particles and fibres achieved in this process was sufficient to considerably reduce dust clearance from the lungs. This would now be regarded as exceeding the maximum tolerated dose and is a condition that in animals, will result in lung inflammation, tumours and mesotheliomas, probably by redirecting fibres to the pleura.

12. ECOLOGICAL INFORMATION

These products are inert materials, which remain stable over time.
No adverse effects of this material on the environment are anticipated.

13. DISPOSAL CONSIDERATIONS

Waste containing more than 0.1 % of RCF is categorised as a hazardous waste, which can generally be disposed of at a landfill, which has been licensed for this purpose. Please refer to the European list (Decision N° 2000/532/CE as modified) to identify your appropriate waste number, and insure national and/or regional regulation are complied with. Taking into account any possible contamination during use, expert guidance should be sought.

Unless wetted, such a waste is normally dusty and so should be properly sealed in clearly labelled containers for disposal. At some authorised disposal sites, dusty waste may be treated differently in order to ensure they are dealt with promptly to avoid them being wind blown. Check for national and/or regional regulations, which may apply.

14. TRANSPORT INFORMATION

Not classified as dangerous goods under relevant international transport regulations (ADR, RID, IATA, IMDG).
Ensure that dust is not wind blown during transportation.

15. REGULATORY INFORMATION

FIBRE TYPE DEFINITION ACCORDING TO DIRECTIVE 67/548/EEC

Regulatory status comes from European Directive 67/548/EEC on the classification, labelling and packaging of dangerous substances and preparations as modified by Directive 97/69/EC and its implementations by the Member States.

According to Directive 67/548/EEC, the fibre contained in this product belongs to the group of "man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($\text{Na}_2\text{O}+\text{K}_2\text{O}+\text{CaO}+\text{MgO}+\text{BaO}$) content less or equal to 18% by weight".

FIBRE TYPE CLASSIFICATION ACCORDING TO ANNEXE I TO DIRECTIVE 67/548/EEC

Classification: Carcinogen Category 2; Irritant.
Symbol: T (Skull and crossbones - toxic).
Risk phrases:
R49: May cause cancer by inhalation.
R38: Irritating to skin.

This applies to the E.U. only.

Marketing and use of RCF is controlled by Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations as modified (21st amending, Directive 2001/41/EC, 19 June 2001) and is restricted to professional use only.

PROTECTION OF WORKERS

Shall be in accordance with several European directives as amended and their implementations by the Member States:

- a) Council Directive 89/391/EEC dated 12 June 1989 "on the introduction of measures to encourage improvements in the safety and health of workers at work" (OJEC (Official Journal of the European Community) L 183 of 29 June 1989, p.1).
- b) Council Directive 98/24/EC dated 7 April 1997 "on the protection of workers from the risks related to chemical agents at work" (OJEC L 131 of 5 May 1998, p.11)
- c) Council Directive 2004/37/EC dated 29 April 2004 "on the protection of workers from the risks related to exposure to carcinogens at work" (OJEC L 158 of 30 April 2004).

OTHER POSSIBLE REGULATIONS

Member States are in charge of implementing European directives into their own national regulation within a period of time normally given in the directives. Member States may impose more stringent requirements. Please always refer to any national regulation.

16. OTHER INFORMATION

USEFUL REFERENCES (the directives which are cited must be considered in their amended version)

- Hazards from the use of Refractory Ceramic Fibre. Health and Safety Executive: Information document, HSE 267 (1998).
- Working with Refractory Ceramic Fibres; ECFIA; Code of Practice (February 1998).
- TRGS 521: Faserstäube, 2002.
- Maxim LD et al (1998). CARE – A European programme for monitoring and reducing refractory ceramic fibre dust at the workplace initial results; Gefahrstoffe – Reinhaltung der Luft, 58:3,97-103.
- Recognition and control of exposure to RCF, ECFIA, November 1999.
- Council Directive 89/391/EEC dated 12 June 1989 "on the introduction of measures to encourage improvements in the safety and health of workers at work" (OJEC L 183 of 29 June 1989, p.1);
- Council Directive 67/548/EEC "on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances as modified and adapted to the technical progress" (OJEC L 196 of 16 August 1967, p.1 and its modifications and adaptations to technical progress).
- Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress for the 23rd time Council Directive 67/548/EEC (OJEC L 343 of 13 December 1997, p.19).
- Council Directive 98/24/EC of 7 April 1998 "on the protection of the health and safety of workers from the risks related to chemical agents at work" (OJEC L 131 of 5 May 1998, p. 11).
- Council Directive 2004/37/EC dated 29 April 2004 "on the protection of workers from the risks related to exposure to carcinogens at work" (OJEC L 158 of 30 April 2004).

PRECAUTIONARY MEASURES TO BE TAKEN AFTER SERVICE UPON REMOVAL

As produced, all RCF fibres are vitreous (glassy) materials which, upon continued exposure to elevated temperatures (above 900°C), may devitrify. The occurrence and extent of crystalline phase formation is dependent on the duration and temperature of exposure, fibre chemistry and/or the presence of fluxing agents. The presence of crystalline phases can be confirmed only through laboratory analysis of the "hot-face" fibre.

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 "in making the overall evaluation, the Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied..."

In most jurisdictions there are specific occupational exposure limits for crystalline silica (quartz, cristobalite) which may vary between countries and local jurisdictions. Check which exposure levels apply to your facility and comply with local regulation.

Simulated after-service RCF, containing 27% of crystalline silica, showed little, or no, activity where exposure was by inhalation or by intraperitoneal injection. After-service RCF was not cytotoxic to macrophage-like cells.

High concentrations of fibres and other dusts may be generated when after-service products are mechanically disturbed during operations such as wrecking. These dusts may contain crystalline silica. Therefore ECFIA recommends:

- a) control measures are taken to reduce dust emissions; and
- b) all personnel directly involved wear an appropriate respirator to minimise exposure and comply with local regulatory limits.

These procedures will ensure compliance with local regulatory exposure standards for free crystalline silica. And because devitrified fibres containing silica mixed with amorphous and other crystalline phases are far less biologically active than free crystalline silica dusts, these measures will provide a high degree of protection.

CARE PROGRAMME ("CONTROLLED AND REDUCED EXPOSURE")

The European Ceramic Fibres Industry Association (ECFIA) has undertaken an extensive hygiene programme for High Temperature Insulation Wool (HTIW). The objectives are twofold: (i) to monitor workplace dust concentrations at both manufacturers' and customers' premises, and (ii) to document manufacturing and use of HTIW products from an industrial hygiene perspective in order to establish appropriate recommendations to reduce exposures. The initial results of the programme have been published (see Maxim LD et al referenced above). If you wish to participate in the CARE programme, contact ECFIA or your local Thermal Ceramics' supplier.

SPRAYING

ECFIA recommends that this fibre be not used for spraying.

WEBSITES:

For more information connect to:

The Thermal Ceramics' website: www.thermalceramics.com

Or the ECFIA's website: www.ecfia.org

Or Deutsche KeramikFaser-Gesellschaft e.V'. website: www.dkfg.de

TECHNICAL DATA SHEETS

For more information on individual products please see the relevant technical data sheet as listed below.

Thermo-Bloc	5-6-17
Cerablanket, Cerachem Blanket, Cerachrome	5-5-01
Cerafiber, Cerachem, Cerachrome Fibre	5-5-06
Pyro-Blok Modules	5-6-02
Pyro-Log	5-6-03
Z-Blok 1 Modules	5-6-05
Z-Blok 3 Modules	5-6-06
Z-Blok Refractory Fibre Modules	5-6-07
Ultrafelt	5-6-11
Thermo-Bloc	5-6-17
Kaowool Bulk Fibre	5-7-10
Kaowool Blanket S + Kaowool Blanket Szr	5-7-12

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 safe as provided by law, 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 practice any patented invention without a 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 (however, this shall not act to restrict the vendor's potential liability for negligence or under statute).