



### MASTIC 1400 MOULDABLE, MASTIC 1500 MOULDABLE

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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

This product is used to fill gaps in refractory applications particularly fibre-based refractories. It is highly resistant to spalling and cracking and has also very good adhesive properties. Mastic could be used as seam filler, gap filler, caulking agent, patching repair material, lining material for launders, and so on. (Please refer to specific technical data sheet for more information).

##### IDENTIFICATION OF THE COMPANY

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#### 2. COMPOSITION / INFORMATION ON INGREDIENTS

##### DESCRIPTION

These products in the form of mouldable mastics are made of refractory ceramic and polycrystalline fibres. Once dried out, these products may generate dust.

##### COMPOSITION

COMPONENT	%	CAS NUMBER	SYMBOL	R PHRASES
Refractory Ceramic Fibre	5-45	142 844-00-6	T, Xi	R49, R38
Polycrystalline Fibre	< 20	(EINECS:215-691-6)	Xn	R40, R38
Colloidal silica	40-80	7631-86-9	N.A.	N.A.
Monoethylene glycol	1-7	203-473-3	Xn	R22
Organic material	< 5	N.A.	N.A.	N.A.

Chemical composition of refractory ceramic fibres:

SiO<sub>2</sub>: 48-60 %, Al<sub>2</sub>O<sub>3</sub>: 25-55 %, ZrO<sub>2</sub> < 16%, Cr<sub>2</sub>O<sub>3</sub> < 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 FOR REFRACTORY CERAMIC FIBRE**

Refractory ceramic fibres belong to a group of fibres classified under Directive 97/69/EC as category 2 carcinogen ("substances which should be regarded as if they are carcinogenic to human"). Based on results of some animals' studies there is a concern that excessive dust exposure may cause fibrosis and cancer of the lung or the pleura. This has not been confirmed by human data.

Furthermore, the International Agency for Research on Cancer (IARC) has classified RCF including polycrystalline fibres in group 2B "possibly carcinogenic to humans", based on sufficient evidence of carcinogenicity in animals, but inadequate evidence in humans (Monograph 43).

#### **CHRONIC RESPIRATORY HEALTH EFFECTS FOR ETHYLENE GLYCOL**

NIOSH recently described evidence that ethylene glycol has potential reproductive hazards by inhalation of ethylene glycol mist.

### **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. However, virgin product binder may burn and produce gases and/or fumes. Packaging and surrounding materials may be combustible.

Use extinguishing agent suitable for surrounding combustible materials.

### **6. ACCIDENTAL RELEASE MEASURES**

Use gloves, boots and rubber protection clothes when cleaning up.  
Avoid clean up procedure that could result in water pollution.

### **7. HANDLING AND STORAGE**

#### **HANDLING**

Do not handle wet product with bare hands. The process or processes should be designed to limit the amount of handling. Regular good housekeeping will minimise secondary dispersal.

#### **STORAGE**

Store in dry and cool condition. Always use sealed and clearly labelled containers. Avoid storage in temperature lower than +5°C (risk of solidification) or above +40°C. Avoid damaging the packaging and keep closed when not in use. 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

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 <sup>3</sup>	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.*

The long-term exposure limit (TWA 8 hours) for ethylene glycol in Germany and in the U.K. is respectively **26 mg/m<sup>3</sup>** and **60 mg/m<sup>3</sup>**.

The short-term exposure limit (TWA 15 min) for ethylene glycol in the USA and in France is respectively **100 mg/m<sup>3</sup>** and **125 mg/m<sup>3</sup>**.

### 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 paste	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.
RELATIVE DENSITY	1300-1400 kg/m <sup>3</sup>	VAPOUR PRESSURE	N.A.
SOLUBILITY	Slight	pH	9.7
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.

### FUMES

During first heating, oxidation products from the organic binder might be emitted in a temperature range from 180°C to 600°C. It is recommended to ventilate the room until all gases and fumes have disappeared. Avoid exposure to high concentrations of gas or fumes.

## 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 intraperitoneal 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.

## EXPERIMENTAL STUDIES FOR POLYCRYSTALLINE FIBRE

Polycrystalline fibre was administered to rats in intraperitoneal, intratracheal and intrapleural studies and all showed negative results. This comprehensive group of toxicological studies indicates that polycrystalline fibres showed no fibrogenic, neither carcinogenic nor other significant toxicological effects when exposure occurs by relevant routes (i.e. by inhalation or oral ingestion) or when introduced artificially into the lung in large quantities by injection. Despite the evidence, the IARC has placed polycrystalline "Alumina Fibre" into a broad group called ceramic fibres.

## EXPERIMENTAL STUDIES FOR ETHYLENE GLYCOL

Ethylene glycol toxicity by ingestion includes kidney effects with oxalate crystal deposition and liver damage. By inhalation exposure, lung changes and irritation of mucosal surfaces occurred in rats. A slight effect on reproduction was seen in mice administered 2000 mg/kg/day in their drinking water. During the studies with pregnant animals where high doses of ethylene glycol have been administered, foetal and maternal toxicity was observed.

## 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).

## 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 (Na<sub>2</sub>O+K<sub>2</sub>O+CaO+MgO+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 (21<sup>st</sup> 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 90/394/EC of 28 June 1990 "on the protection of workers from the risks related to exposure to carcinogens at work" (OJEC L 196 of 26 July 1990, p.1).

#### **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 23<sup>rd</sup> 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 90/394/EC of 28 June 1990 "on the protection of workers from the risks related to exposure to carcinogens at work" (OJEC L 196 of 26 July 1990, p.1).

## **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.

## **WEBSITES:**

For more information connect to:

The Thermal Ceramics' website: [www.thermalceramics.com](http://www.thermalceramics.com)

Or the ECFIA's website: [www.ecfia.org](http://www.ecfia.org)

Or Deutsche KeramikFaser-Gesellschaft e.V'. website: [www.dkfg.de](http://www.dkfg.de)

## **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).