

MATERIAL SAFETY DATA SHEET

PRODUCT **RIGIDISED VACUUM FORMED CERAMIC FIBRE PRODUCTS**
Date Prepared: July 2005
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1. Identification of the product and of the company

Product
Vacuum formed shapes containing synthetic vitreous alumino-silicate fibres.
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2. Composition/information on ingredients

DESCRIPTION

These products in the form of pre formed shapes are made with refractory ceramic fibres and amorphous silica as the main ingredients.

Composition				
Component	%	EINECS No.	SYMBOL	R PHRASES
Refractory Ceramic Fibre	15 - 95	142-844-00	T	R49
Starch	0 - 10	232-679-6	N.A.	N.A.
Amorphous Silica	1 - 75	231 545 4	N.A.	N.A.

Chemical composition of refractory ceramic fibres : SiO₂ : 45-60 %, Al₂O₃ : 40-55%.

3. Hazards identification

Irritant Effects

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

Chronic respiratory health effects

RCF's have been classified by the EU 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.

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

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.

Packaging and surrounding materials may be combustible.

Use extinguishing agent suitable for type of surrounding combustible materials.

Wear self-contained breathing apparatus when entering in oxygen deficient areas.

6. Accidental release measures

Personal protection

In case of accidental release or spillage likely to result in an abnormally high dust exposure, provide the workers with appropriate protective equipment as detailed in section 8. Restrict access to the areas to a minimum number of workers. Restore the situation to normal as quickly as possible. Prevent further dust dispersion for example by damping the materials.

Methods for cleaning up

Pick up large pieces and use a vacuum cleaner fitted with high efficiency filter. If brushing is used, ensure that the area is wetted down first. Do not use compressed air for clean up. For waste disposal refer to section 13.

Environmental protection

Do not allow to be wind blown. Do not flush spillage to drain and prevent from entering natural water courses. Check for local regulations which may apply.

7. Storage

Store in dry conditions.

8. Exposure control / personal protection

Hygiene standards and control measures

Hygiene standards and exposure limits may differ from country to country. Check those currently applying in your country and comply with local regulations.

Exposure limit in January 2007 is given below:

United Kingdom 1.0 f/ml (WEL) HSE EH40 Workplace Exposure Limit

**8-hr time weighted average concentrations of airborne respirable fibres measured using the conventional membrane filter method*

Techniques to reduce dust exposure to a minimum

NOTE: Rigidised products are hardened with amorphous silica and therefore less prone to abrasion and dusting than non rigidised products.

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

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

Designate 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 using brooms 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.

PERSONAL PROTECTIVE EQUIPMENT

Skin and eye protection

Wear gloves and overalls which are loose fitting at the neck and wrist .

Wash work clothing separately.

It is good hygiene practice to ensure work clothes are washed separately by the employer. Work clothes should not be taken home.

Wear goggles or safety glasses with side shields in case of overhead working.

After handling rinse exposed skin with water.

Respiratory protection

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

Use appropriate respiratory protective equipment (RPE) against excessive concentrations of fibrous dust or other possible contaminant which could have been introduced.

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.

9. Physical and chemical properties

Physical State	Solid	Odour	None
Melting point	> 1650° C	Explosives properties	None
Flammability	None	Bulk density	0.3 – 0.5 g/cm ³
Oxidising properties	None	Length weighted geometric mean diam.	>1.5 microns
Appearance	White or dyed to indicate the degree of rigidisation		

10. Stability and reactivity

Conditions or materials to avoid

None

Decomposition products

When first heated above 200°C, the starch binder will start to decompose and oxidise. The decomposition products are mainly carbon dioxide, carbon monoxide, carbon particles, water, and trace gases (e.g. nitrogen dioxide, sulphur dioxide)

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. However in most foundry applications the time for which the material is exposed to high temperatures is far too short for detectable amounts of crystalline silica to be formed.

11. Toxicological information

Irritant properties

RCF is negative when tested using approved methods (Directive 67/548/EC, 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 slight reddening. Unlike other irritant reactions this is not the result of allergy or chemical skin damage but is caused by a temporary mechanical effect.

Epidemiology

The University of Cincinnati is conducting an ongoing epidemiologic investigation. The evidence obtained from employees in U.S. RCF manufacturing facilities is as follows:

1) There is no evidence of any fibrotic lung disease (interstitial fibrosis) from evaluations of chest X-rays.
2) There is no evidence of an elevated incidence of lung disease among RCF manufacturing employees.
3) In early studies, an apparent statistical “trend” was observed, in the exposed population, between RCF exposure duration and some measures of lung function. The observations were clinically insignificant. If these observations were made on an individual employee, the results would be interpreted as being within the normal (predicted) respiratory range. A more recent longitudinal study of employees with 5 or more pulmonary function tests found that there was no effect on lung function associated with RCF production experience. Initial data (circa 1987) seemed to indicate an interactive effect between smoking and RCF exposure; more recent data, however, found no interactive effect. Nevertheless, to promote good health, RCF employees are still actively encouraged not to smoke.

4) Pleural plaques (thickening along the chest wall) have been observed in a small number of RCF employees. Some studies appear to show a relationship between the occurrence of pleural plaques on chest radiographs and the following variables: (a) years since RCF production hire date; (b) duration of RCF production employment; and (c) cumulative RCF exposure. The best evidence to date indicates that pleural plaques are a marker of exposure only. Pleural plaques are not associated with pulmonary impairment. The pathogenesis of pleural plaques remains incompletely understood; however, the mechanism appears to be an inflammatory response caused by inhaled fibers.

TOXICOLOGY

A number of toxicological studies designed to identify any potential health effects from RCF exposure have been completed. In one study, conducted by the Research and Consulting Company, (Geneva, Switzerland), rats and hamsters were exposed to 30 mg/m³ (about 200 fibers/cc) of specially-prepared RCF for 6 hours/day, 5 days/week, for up to 24 months. In rats, a statistically significant increase in lung tumors was observed; two mesotheliomas (cancer of the pleural lining between the chest wall and lung) were also identified. Hamsters did not develop lung tumors; however, interstitial fibrosis and mesothelioma was found. Some, in the scientific community, have concluded that the “maximum tolerated dose” was exceeded and that significant particle contamination was a confounding issue; therefore, these study findings may not represent an accurate assessment of the potential for RCF to produce adverse health effects.

In a related multi-dose study with a similar protocol, other rats were exposed to doses of 16 mg/m³, 9 mg/m³, 3 mg/m³ which corresponds to about 115, 75, and 25 fibers per cubic centimeter respectively. This study found no statistically significant increase in lung cancer. Some cases of pleural and parenchymal fibrosis were seen in the 16 mg/m³ dose group. Some cases of mild fibrosis and one mesothelioma were observed in the 9 mg/m³ group. No acute respiratory effects were seen in the rats in the 3 mg/m³ exposure group, which suggests that there may be a dose/response threshold, below which irreversible respiratory impacts do not occur.

Other toxicological studies have been conducted which utilized non-physiological exposure methods such as intrapleural, intraperitoneal and intratracheal implantation or injection. Some of these studies have found that RCF is a potential carcinogen. Some experts, however, suggest that these tests have limited relevance because they bypass many of the biological mechanisms that prevent fiber deposition or facilitate fiber clearance.

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

RCF is categorised as a stable non-reactive hazardous waste, which can generally be disposed of at landfill, which has been licensed for this purpose. Please refer to the European list (Decision no 2000/532/CE as modified) to identify your appropriate waste number, and ensure 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.
Ensure that dust is not wind blown during transportation.

15. Regulatory information

Fibre type definition according to Directive 67/548/EEC

Regulatory status in the EU, comes from European Directive 67/548/EEC, on the classification, labelling and packaging of dangerous substances and preparations as modified by Directive 97/69/EEC 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”.

This product is an ‘Article’ and is therefore labelled with an ‘Attention’ label.

Protection of workers

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

Council Directive 89/391/EEC dated 12 June 1989 “on the introduction of measures to encourage improvement in the safety and health of workers at work (OJEC (Official Journal of the European Community) L183 of 29 June 1989,p.1).

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).

Council Directive 90/394/EC of 28 June 1990 on the protection of workers from risks related to exposure to carcinogens at work (OJEC L 196 of 26 July 1990,p.1).

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

16. Other information

LABELLING

These vacuum formed products are “articles” and as such, labelling is not mandatory. However, we are complying with the ECFIA recommended labelling.

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

Good Working Practices (HTIW) ; *ECFIA Code of Practice (January 2006)*

Recognition and control of exposure to Refractory Ceramic Fibres (RCF) ; *ECFIA Industrial hygiene guide (November 1999)*

Hazard from the use of Refractory Ceramic Fibres. Health and Safety Executive ; *Information document HSE 267 (1998)- UK*

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 provision 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 Official Journal of the European Communities, 13/12/97 , p.19*).

Council Directive 90/394/EC “on the protection of workers from risks related to exposure to carcinogens at work” *Official journal of the European Communities, 26/07/90*

Council Directive 98/24/EC of 7th April 1998 “on the protection of the health and safety of workers from risks related to chemical agents at work” (*OJEC L131 of 5th May 1998, P.11*)

TRGS 521 : Faserstaube 5/2002 - Germany

TRGS 619 - Germany

Maxime LD et al (1998), CARE – A European pro-gramme for monitoring and reducing refractory ceramic fibres dust at the workplace Initial results. *Gefahrstoffe – Reinhaltung der Luft, 58-3, 97-103.*

Refractory ceramic fibres : a substitute study, *RCFC document, March 1996.*

Circulaire DRT No 954 du 12/01/95- France

Circolare 15 marzo 2000, n.4 – Italy

Precautionary measures to be taken after service and upon removal

As produced, all RCF fibres are vitreous (glassy) materials which, if raised up to continued exposure to elevated temperatures (above 900°C) might de-vitrify. 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. 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 removal operations such as break out and sand reclamation. These dusts may contain crystalline silica, which some authorities have classified as a carcinogen. Therefore ECFIA recommends:

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

NOTE

The directives and subsequent regulations detailed in this Material Safety Data Sheet are only applicable to the European Union (EU) Countries and not to countries outside of the EU.

The information presented here in 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. 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.