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**1. CHEMICAL PRODUCT AND COMPANY INFORMATION****Product Group:** REFRACTORY CERAMIC FIBER PRODUCT**Product Type:** VITREOUS ALUMINOSILICATE FIBER**Synonym(s):** RCF, ceramic fiber, synthetic vitreous fiber (SVF), man-made vitreous fiber (MMVF), man-made mineral fiber (MMMF), high temperature insulation wool (HTIW)**Trade Names:** MaxCoat**Company Name And Address:****Manufacturer/Supplier:** Nutec Fibratex, S.A. de C.V.  
Jardin de San Jeronimo 225  
Colonia San Jeronimo  
64640 Monterrey, N.L., Mexico  
Phone (MX): +52(81) 8151-4646  
<http://www.nutec.com>**2. COMPOSITION / INFORMATION ON INGREDIENTS**

Substance	% Range	Identification CAS No.
Refractories, Fibers, aluminosilicate	10-30	142844-00-6
Silica, Colloidal	3-15	7631-86-9
Hydroxyethylcellulose	0-10	9004-62-0
Water	50-60	7732-18-5
Antimicrobial preservative	1-2	MIXTURE

**3. HAZARDS IDENTIFICATION****May cause cancer by inhalation****CHRONIC EFFECT**

There has been no increased incidence of respiratory disease in studies examining occupationally exposed workers. In animal studies, long term laboratory exposure to doses hundreds of times higher than normal occupational exposures has produced fibrosis, lung cancer and mesothelioma in rats or hamsters. The fibers used in those studies were specially sized to maximize rodent respirability.

**POTENTIAL HEALTH EFFECTS****LIKELY ROUTES OF EXPOSURE:** Respiratory Tract (nose and throat), Eyes, Skin

**RESPIRATORY TRACT****EYE IRRITATION:**

May cause temporary, mild mechanical irritation. Fibers may be abrasive; prolonged contact may cause damage to the outer surface of the eye.

**SKIN IRRITATION:**

May cause temporary, mild mechanical irritation. Exposure may also result in inflammation, rash or itching.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:**

Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease may be aggravated by exposure; individuals who have a history of allergies may experience greater amounts of skin and respiratory irritation.

**4. FIRST AID MEASURES****Inhalation.**

If respiratory tract irritation develops, move the person to a dust free location. Get medical attention if the irritation continues. See Section 8 for additional measures to reduce or eliminate exposure.

**Eye contact.**

If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes. Get medical attention if irritation persists.

**Skin contact.**

If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.

**Ingestion.**

If gastrointestinal tract irritation develops, move the person to a dust free environment.

**Notes to Physicians.**

Skin and respiratory effects are the result of temporary, mild mechanical irritation; fiber exposure is not known to result in allergic manifestations.

**5. FIRE FIGHTING MEASURES****NFPA Unusual Hazards.**

None

**Flammable Properties.**

None combustible.

**Flash Point.**

None

**Hazardous Decomposition Products.**

Product is not combustible, but a slight flame may be observed when product is first exposed to flame. Product will emit smoke and fume upon initial exposure to high temperature. Combustion products may include CO, CO<sub>2</sub>, and SOX. Use adequate ventilation or other precautions to eliminate exposure to vapors resulting from thermal decomposition of binder. Exposure to thermal decomposition fumes may cause respiratory tract irritation, bronchial hyper-reactivity or an asthmatic-type response.

**Unusual Fire and Explosion Hazard.**

None

**Extinguishing Media.**

Use extinguishing media suitable for type of surrounding fire

**6. ACCIDENTAL RELEASE MEASURES**

**Spillage:** Avoid creating airborne dust. Dust suppressing cleaning methods such as wet sweeping or vacuuming should be used to clean the work area. If vacuuming, the vacuum must be equipped with a HEPA filter. Compressed air or dry sweeping should not be used for cleaning.

**7. HANDLING AND STORAGE**

**Handling.**

Handle ceramic fiber carefully. Limit use of power tools unless in conjunction with local use exhaust. hand tools whenever possible. Frequently clean the work area with HEPA filtered vacuum or wet sweeping to minimize the accumulation of debris. Do not use compressed air for clean-up.

**Empty Containers.**

Product packaging may contain residue. Do not reuse.

**Storage.**

Store in original container in a dry area. Keep container closed when not in use.

**8. EXPOSURE CONTROLS AND PERSONAL PROTECTION**

COMPONENTS	OSHA PEL	ACGIH TLV	MANUFACTURER REG
Refractories, Fibers, Aluminosilicate	None Established*	See Note*	0.5 f/cc, 8-hr. TWA**
Aluminum silicate	None Established	None Established	None Established
Colloidal Silica	20 mppcf or 80 mg/m <sup>3</sup> / %SiO <sub>2</sub>	10 mg/m <sup>3</sup>	None Established
Hydroxyethylcellulose	None Established	None Established	None Established
Antimicrobial preservative	None Established	None Established	None Established

\* There is no specific regulatory standard for RCF in the U.S. OSHA's "Particulate Not Otherwise Regulated (PNOR)" standard (29 CFR 1910.1000, Subpart Z, Air Contaminants) applies generally: Total Dust 15 mg/m<sup>3</sup> ; Respirable Fraction 5 mg/m<sup>3</sup>

\*\* The High Temperature Insulation Wool Coalition (HTIW) has sponsored comprehensive toxicology and epidemiology studies to identify potential RCF-related health effects [see Section 11 for more details], consulted experts familiar with fiber and particle science, conducted a thorough review of the RCF-related scientific literature, and further evaluated the



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data in a state-of-the-art quantitative risk assessment. Based on these efforts and in the absence of an OSHA PEL, HTIW has adopted a recommended exposure guideline, as measured under NIOSH Method 7400 B. The manufacturers' REG is intended to promote occupational health and safety through prudent exposure control and reduction and it reflects relative technical and economic feasibility as determined by extensive industrial hygiene monitoring efforts undertaken pursuant to an agreement with the U.S. Environmental Protection Agency.

## **OTHER REGULATORY & NON-REGULATORY OCCUPATIONAL EXPOSURE LEVELS (OEL)**

RCF-related occupational exposure limits vary internationally. Regulatory OEL examples include: California – 0.2 f/cc; Austria – 0.5 f/cc; Canada – 0.2 to 1.0 f/cc; United Kingdom – 1.0 f/cc. Non-regulatory OEL examples include: ACGIH TLV 0.2 f/cc; HTIW REG 0.5 f/cc. The objectives and criteria underlying each of these OEL decisions also vary. The evaluation of occupational exposure limits and their relative applicability to the workplace are best performed, on a case-by-case basis, by a qualified Industrial Hygienist.

## **ENGINEERING CONTROLS**

Use engineering controls such as local exhaust ventilation, point of generation dust collection, down draft work stations, emission controlling tool designs, and materials handling equipment designed to minimize airborne fiber emissions.

## **PERSONAL PROTECTION EQUIPMENT**

### **Respiratory Protection - RCF:**

When engineering and/or administrative controls are insufficient, the use of appropriate respiratory protection, pursuant to the requirements of OSHA 29 CFR 1910.134 AND 1926.103, is recommended. The following information is provided as an example of appropriate respiratory protection for aluminosilicate fibers. The evaluation of workplace hazards and the identification of appropriate respiratory protection are best performed, on a case-by-case basis, by a qualified Industrial Hygienist.

<b>MANUFACTURER'S RESPIRATORY PROTECTION RECOMMENDATIONS WHEN HANDLING RCF PRODUCTS</b>	
<b>Respirable Airborne Fiber Concentration</b>	<b>Respirator Recommendation+</b>
Less than 0.5 f/cc	No specific recommendation. User preference based upon conditions present.
0.5 f/cc - 5.0 f/cc	Half-face, air-purifying respirator equipped with a NIOSH approved P100 particulate filter cartridge
5.0 f/cc - 25 f/cc	Full-face, air-purifying respirator equipped with a NIOSH approved P100 particulate filter cartridge

+ The P100 recommendation is a conservative default choice; in some case, solid arguments can be made that other respirator types (e.g., N95, R99, etc.) may be suitable for some tasks or work environments. The P100 recommendation is not designed to limit informed choices, provided that respiratory protection decisions comply with 29 CFR 1910.134.

## **OTHER INFORMATION:**

- (1) Concentrations based upon an eight-hour time-weighted average (TWA) as determined by air samples collected and analyzed pursuant to NIOSH method 7400 (B) for airborne fibers.
- (2) The manufacturer recommends, at a minimum, the use of full-facepiece air-purifying respirator equipped with appropriate particulate filter cartridge during furnace tear-out events and the removal of used RCF to control exposures to



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airborne fiber and the potential presence of crystalline silica.

(3) Potential exposure to other airborne contaminants should be evaluated by a qualified industrial hygienist for the selection of appropriate respiratory protection and air monitoring.

## **SKIN PROTECTION:**

Wear gloves, head coverings and full body clothing as necessary to prevent skin irritation. Washable or disposable clothing may be used. If possible, do not take unwashed clothing home. If soiled work clothing must be taken home, employers should ensure employees are thoroughly trained on the best practices to minimize or avoid non-work dust exposure (e.g., vacuum clothes before leaving the work area, wash work clothing separately, rinse washer before washing other household clothes, etc.).

## **EYE PROTECTION:**

Wear safety glasses with side shields or other forms of eye protection in compliance with appropriate OSHA standards to prevent eye irritation. The use of contact lenses is not recommended, unless used in conjunction with appropriate eye protection. Do not touch eyes with soiled body parts or materials. If possible, have eye-washing facilities readily available where eye irritation can occur.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>ODOR AND APPEARANCE:</b>	Products in this group may be off-white to light-brown color as a wet mixture of chopped ceramic fiber, fine particles, and bonds. Odorless. May be packaged in 5-gallon containers or caulk tubes. The Module Coat is a dry light red mixture of fine particles and ceramic fibers to be mixed with water before applying.
<b>CHEMICAL FAMILY:</b>	Vitreous Aluminosilicate Fibers
<b>BOILING POINT:</b>	100 °C (212°F) for water component
<b>WATER SOLUBILITY (%):</b>	Slight 0-1%
<b>MELTING POINT:</b>	1760 °C (3200 °F)
<b>SPECIFIC GRAVITY:</b>	2.50 - 2.75
<b>VAPOR PRESSURE:</b>	Not Applicable
<b>pH:</b>	Not Applicable
<b>VAPOR DENSITY (Air = 1):</b>	Not Applicable

## **10. STABILITY AND REACTIVITY**

### **CHEMICAL STABILITY.**

Stable under conditions of normal use.

### **INCOMPATIBILITY.**

None Known.

### **CONDITIONS TO AVOID.**

None

### **HAZARDOUS DECOMPOSITION PRODUCTS.**

Thermal decomposition of binder from fires or from first heat of product may release smoke, carbon monoxide, carbon dioxide, aldehydes, and carboxylic acids. Use adequate ventilation or other precautions to eliminate exposure to vapors

resulting from thermal decomposition of binder. Exposure to thermal decomposition fumes may cause respiratory tract irritation, bronchial hyper-reactivity or an asthmatic-type response.

## 11. TOXICOLOGICAL INFORMATION

**HEALTH DATA SUMMARY** There has been no increased incidence of respiratory disease or other significant health effects in occupationally exposed workers. In animal studies, long-term, high-dose inhalation exposure resulted in the development of respiratory disease in rats and hamsters

### **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) An early 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.
- 4) Pleural plaques (thickening along the chest wall) have been observed in a small number of RCF employees. The best evidence to date indicates that pleural plaques are a marker of exposure only. Under most circumstances, 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.
- 5) 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.

### **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/m<sup>3</sup> (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/m<sup>3</sup>, 9 mg/m<sup>3</sup>, 3 mg/m<sup>3</sup> 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/m<sup>3</sup> dose group. Some cases of mild fibrosis and one mesothelioma were observed in the 9 mg/m<sup>3</sup> group. No acute respiratory effects were seen in the rats in the 3 mg/m<sup>3</sup> exposure group, which suggests that there may be a dose/response threshold, below which irreversible respiratory impacts do not occur.



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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

No Data Available

## 13. DISPOSAL INFORMATION

### WASTE MANAGEMENT

To prevent waste materials from becoming airborne during waste storage, transportation and disposal, a covered container or plastic bagging is recommended.

### DISPOSAL

RCF, as manufactured, is not classified as a hazardous waste according to Federal regulations (40 CFR 261). Any processing, use, alteration or chemical additions to the product, as purchased, may alter the disposal requirements. Under Federal regulations, it is the waste generator's responsibility to properly characterize a waste material, to determine if it is a "hazardous" waste. Check local, regional, state or provincial regulations to identify all applicable disposal requirements

### EUROPEAN UNION

Check local, regional, state or provincial regulations to identify all appropriate disposal requirements. Contamination during use or chemical additions to the product may alter the disposal requirements.

## 14. TRANSPORT INFORMATION

### U.S. DEPARTMENT OF TRANSPORTATION (DOT)

Hazard Class: Not Regulated United Nations (UN) Number: Not Applicable

Labels: Not Applicable North America (NA) Number: Not Applicable

Placards: Not Applicable Bill of Lading: Product Name

### INTERNATIONAL

Canadian TDG Hazard Class & PIN: Not regulated.

Not classified as dangerous goods under ADR (road), RID (train) or IMDG (ship).

## 15. REGULATORY INFORMATION

### Products or components of mixture regulated under the following

#### **U.S.A. Hazard Class:**

HMIS Codes:	Health: 1	Fire: 0	Reactivity: 0	Protection: Employer Determined
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NFPA Codes:	Health: 1	Fire: 0	Reactivity: 0	Special: 0
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**UNITED STATES REGULATIONS:****EPA: Superfund Amendments and Reauthorization Act (SARA) Title III****Section 302:** No (Extremely Hazardous Substances)**Section 304:** No (Emergency Release)**Section 311:** Yes (Acute and Chronic Effects – MSDS)**Section 312:** Yes (Tier I/II)**Section 313:** No

**Toxic Substances Control Act (TSCA)** - All substances in this product are listed, as required, on the TSCA inventory. RCF has been assigned a CAS number; however, it is a simple mixture and therefore not required to be listed on the TSCA inventory. The components of RCF are listed on the inventory.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** and the **Clean Air Act (CAA)** - RCF contains fibers with an average diameter greater than one micron and thus is not considered a hazardous air pollutant.

**OSHA** Comply with **Hazard Communication Standards** 29 CFR 1910.1200 and 29 CFR 1926.59 and the **Respiratory Protection Standards** 29 CFR 1910.134 and 29 CFR 1926.103.

**California:** Ceramic fibers (airborne particles of respirable size)" is listed in **Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986** as a chemical known to the State of California to cause cancer.

**Other States:** RCF products are not known to be regulated by states other than California; however, state and local OSHA and EPA regulations may apply to these products. If in doubt, contact your local regulatory agency.

**INTERNATIONAL REGULATIONS:**

**Canada: Canadian Workplace Hazardous Materials Information System (WHMIS)** – RCF is classified as Class D2A – Materials Causing Other Toxic Effects.

**Canadian Environmental Protection Act (CEPA)** – All substances in this product are listed, as required, on the Domestic Substance List (DSL)

**European Union: European directive 97/69/EC** classified RCF as a Category 2 carcinogen; that is "should be regarded as if it is carcinogenic to man"

**16. OTHER INFORMATION*****RCF DEVITRIFICATION***

As produced, all RCF 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 silica (cristobalite) formation may begin 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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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 ug/cm<sup>2</sup> - by comparison, pure quartz or cristobalite were significantly active at much lower levels (circa 20 ug/cm<sup>2</sup>).

## RCF AFTER-SERVICE REMOVAL

Respiratory protection should be provided in compliance with OSHA standards. During removal operations, a FULL FACE RESPIRATOR (at a minimum) is recommended to reduce inhalation exposure along with eye and respiratory tract irritation. A specific evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed, on a case by case basis, by a qualified industrial hygiene professional.

### DEFINITIONS:

ACGIH: American Conference of Governmental Industrial Hygienists  
ADR: Carriage of Dangerous Goods by Road (International Regulation)  
CAA: Clean Air Act  
CAS#: Stands for Chemical Abstracts Service  
CERCLA: Comprehensive Environmental Response, Compensation & Liability Act  
DSL: Domestic Substance List  
EPA: Environmental Protection Agency  
EU: European Union  
f/cc: Fibers per cubic centimeter  
HEPA: High Efficiency Particulate Air  
HMIS: Hazardous Materials Identification System (National Paint and Coatings Association)  
IARC: International Agency for Research on Cancer  
Group 1: Carcinogenic to Humans. (IARC)  
Group 2A: Probably Carcinogenic to Humans. (IARC)  
Group 2B: Possibly Carcinogenic to Humans. (IARC)  
Group 3: Unclassifiable as to Carcinogenicity in Humans. (IARC)  
Group 4: Probably not Carcinogenic to Humans. (IARC)  
IATA: International Air Transportation Association  
IMDG: International Maritime Dangerous Goods Code  
mg/m<sup>3</sup>: Milligrams per cubic meter  
mppcf: Million particles per cubic meter  
NFPA: National Fire Protection Association  
NIOSH: National Institute for Occupational Safety and Health  
OSHA: Occupational Safety and Health Administration  
29 CFR 1910.134 & 1926.103: OSHA Respiratory Protection Standards  
29 CFR 1910.1200 & 1926.59: OSHA Hazard Communication Standards  
PEL: Permissible Exposure Limit (OSHA)  
PIN: Product Identification Number  
PNOC: Particulates Not Otherwise Classified  
PNOR: Particulate Not Otherwise Regulated  
PSP: Product Stewardship Program  
HTIW: High Temperature Insulation Wool Coalition  
RCRA: Resource Conservation and Recovery Act  
REG: Recommended Exposure Guideline (HTIW)  
REL: Recommended Exposure Limit (NIOSH)  
RID: Carriage of Dangerous Goods by Rail (International Regulations)  
SARA: Superfund Amendments and Reauthorization Act  
TITLE III: Emergency Planning and Community Right To Know Act  
Section 302: Extremely Hazardous Substances  
Section 304: Emergency Release



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Section 311: Community Right-to-Know, MSDS or List of Chemicals  
Section 312: Community Right-to-Know, Inventories & Locations, (Tier I/Tier II)  
Section 313: Toxic Chemicals, Toxic Chemical Release Reporting, Form R  
STEL: Short Term Exposure Limit  
SVF: Synthetic Vitreous Fiber  
TDG: Transportation of Dangerous Goods  
TLV: Threshold Limit Value (ACGIH)  
TSCA: Toxic Substances Control Act  
TWA: Time Weighted Average  
WHMIS: Workplace Hazardous Materials Information System (Canada)

## NOTICE:

Although reasonable care has been taken in the preparation of the information contained herein, Nutec extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

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