

Material Safety Data Sheet

Ceramic Fiber Products

LEWCO RG 2300 Grade Ceramic Fiber Insulation Blanket, Ceramic Fiber Bulk, Ceramic Fiber Fabrics, Ceramic Fiber Rope, Ceramic Fiber Tubing, Ceramic Fiber Sleeving, and Ceramic Fiber Tadpole Tapes.

SECTION I-Product Identification

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Material/Product Name: As listed above.
CAS Number: 142844-00-6
Chemical Family: Inorganic, Amorphous Glass Fiber, RCF (Refractory Ceramic Fiber)
General Use: A high-temperature insulating material

SECTION II –Ingredients Composition

Ingredient name:	CAS Number:	Percent:	IARC/NTP/OSHA:	Exposure Limits:
Refractory Ceramic Fiber (RCF)	142844-00-6	98-100	Yes	Respirable Dust: 5 mg/m ³ (ACGIH TLV-TWA)

Lewco Specialty Products, Inc. recommends an exposure limit of one (1) fiber per cubic centimeter for respirable fiber as an 8-hour time weighted exposure. After-service ceramic fiber may contain crystalline silica in the form of cristobalite; refer to Section 16. Fiber concentration is determined by time weighted air samples collected and analyzed using NIOSH Method 7400 (“B” counting rules).

SECTION III – Hazards Identification

HEALTH HAZARD	2 – MODERATE
FLAMMABILITY HAZARD	0 – MINIMAL
REACTIVITY HAZARD	0 – MINIMAL
PERSONAL PROTECTION	E – Glasses, Gloves Dust Respirator

Emergency Overview:

The fiber is a physical eye, skin and upper respiratory irritant. Dust generated from this product will contain respirable fiber. Not a fire or spill hazard.

Medical conditions which may be aggravated by contact:

Dust from the product may aggravate existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Target Organs: Lungs, Eyes, Skin.

Primary route(s) of entry: Inhalation

Acute effects: Upper respiratory irritation, including irritation of throat. Irritation and inflammation to the eyes on contact and to the skin on prolonged contact.

Chronic effects: The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including RCF) in 1987. IARC classified RCF as “possibly carcinogenic to humans” Group 2B. IARC’s classification of RCF was based on sufficient evidence of carcinogenicity in experimental animals in the absence of data on the carcinogenicity of RCF to humans. Additionally, IARC classified cristobalite, which may be found in after-service RCF as “probably carcinogenic to humans” Group 2A. The long-term, excessive inhalation of respirable fiber may contribute to the development of industrial bronchitis, reduced breathing capacity, and lead to increased susceptibility to other lung disease.

Signs & symptoms of overexposure:

- Eye Contact:** Fiber and particulate matter may contribute to the development of moderate eye irritation
- Skin Contact:** Contact with bare skin may contribute to the development of moderate skin irritation by its abrasive action.
- Inhalation:** Inhalation of airborne particulate can irritate upper respiratory system as well as the throat.
- Ingestion:** An unlikely route of exposure. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms will include irritation and may include nausea, vomiting, and abdominal pain.

SECTION IV – First Aid Measures

- Eye Contact:** Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.
- Skin Contact:** Wash affected areas with mild soap and water.
- Inhalation:** Remove victim from adverse environment to fresh air.
- Ingestion:** Ingestion is an unlikely route of exposure. If ingested in sufficient quantity and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

SECTION V – Fire Fighting Measures

NFPA code: Flammability: 0, Health 0, Reactivity: 0, Special: 0

- Flash Point:** Product is not combustible
- Extinguishing media:** Use extinguishing media appropriate to combustibles in area of fire.
- Firefighting instructions:** Firefighters should wear NIOSH-approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

SECTION VI – Accidental Release Measures

Spill procedures: Carefully, cleanup and place material into a suitable covered container, being careful to avoid creating any airborne dust. Use HEPA filtered vacuum equipment if available, if not, use a dust suppressant with sweeping; do not use compressed air. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

SECTION VII – Handling and Storage

Storage: These products are stable under all conditions of storage. Store in original container in a dry area. Keep container closed when not in use. Avoid creating dust.

SECTION VIII – Exposure Controls and Personal Protection

Available Information: Lewco has a brochure Safe Workplace Guidelines for Handling Refractory Ceramic Fibers available from sales offices or by phone request.

Engineering controls: Pending results of long-term health effects studies, engineering controls (i.e. ventilation) and work practices should be established to control levels of airborne fiber to the lowest level attainable. Provide sufficient ventilation, in both volume and air flow patterns to control the fiber/dust concentrations below allowable exposure limits.

Personal protective equipment: Goggles, gloves, respirators, long sleeve clothing and head covering.

Respiration protection: Lewco Specialty Products currently recommends an exposure limit of one fiber per cubic centimeter (1 f/cc) for respirable airborne ceramic fiber as an 8 – hour time weighted average exposure. Provide workers with NIOSH/MSHA-approved respirators in accordance with requirements of 29 CFR 1910.134 when airborne concentrations of respirable fiber and/or cristobalite exceed the recommended limits.

The following are recommended respirator types for the varying respirable airborne concentrations of ceramic fiber and/or cristobalite.

<u>Fiber</u>	<u>Cristobalite</u>	<u>Respirator Type</u>
< 1 f/cc	<0.05 mg/m ³	Optional disposable respirator (example: 3M 9900)
1-5 f/cc	0.05-0.5 mg/m ³	Half-mask air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges (example: 3M 6340)
5-25 f/cc	0.5-2.5 mg/m ³	Full-face piece air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges (example: 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) with HEPA filter cartridges.
>25 F/cc	>2.5 mg/m ³	Any supplied-air respirator operated in positive pressure mode (example: 3M 7800 with W9435 hose and W3196 regulator connected to clean air supply).

Airborne fiber and cristobalite concentrations are determined by time-weighted air samples collected and analyzed using NIOSH Method 7400 (“B” counting rules) and 7500, respectively. Exposures are expressed as 8-hour time weighted averages.

SECTION IX-Physical and Chemical Properties

Appearance: white, odorless, fibrous material in loose, bat, blanket, cloth, rope and folded or stacked into module form of various sizes and shapes.

Boiling Point: Not Applicable
Melting Point: >2900°F (1590°C)
Water Solubility: 0
pH: Not Applicable

Specific Gravity (g/cc): 2.5 – 2.7
Bulk Weight (lbs/ft³): 4-16
% Volatile by volume: 0
Evaporation rate: Not Applicable

SECTION X – Stability and Reactivity

Hazardous Polymerization: Will not occur

Chemical Incompatibilities: Hydrofluoric acid, strong acid and alkali vapors

Hazardous Decomposition Products: None

SECTION XI – Toxicological Information

Epidemiology:

Industry epidemiologic investigations of RCF production workers and surveillance of customer's employees using RCF is ongoing. Lewco has an active product stewardship program to monitor and disseminate information as it becomes available. Preliminary interim results¹, obtained from employees in RCF manufacturing facilities, is as follows:

1. There is no evidence of any fibrotic lung disease (interstitial fibrosis) on x-ray.
2. There is no evidence of any lung disease among those employees exposed to RCF that have never smoked.
3. A statistical trend was observed in the exposed population between the duration of exposure to RCF and a decrease in some measures of pulmonary function. These observations are clinically insignificant. In other words, if these observations were made on an individual employee, the results would be interpreted as being within the normal range.
4. Pleural plaques (thickening along the chest wall) have been observed in a small number of employees who had a long duration of employment. There are several occupational and non-occupational causes for pleural plaque. It should be noted that plaques are not pre-cancer nor are they associated with any measurable effect on lung function.

Toxicology:

The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool) and classified MMVF as a possible human carcinogen (Group 2B). IARC's 2B classification was based on sufficient evidence of carcinogenicity in experimental animals and inadequate evidence (no Data) of the carcinogenicity of ceramic fibers to humans.

A number of studies on the health effects of inhalation exposure of rats and hamsters have recently been completed. In a lifetime nose-only inhalation study^{2,3}, rats exposed to the Maximum Tolerated Dose of 30 mg/m³ (approximately 200 fibers/cc) developed pleura (lining of the chest and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma.

In another lifetime nose-only inhalation study^{4,5}, rats were exposed to three different concentrations of RCF (3, 9, and 16 mg/m³; approximately 25, 75, and 115 fibers per cc respectively). The data from this study demonstrated a dose-response relationship in the biological affects of RCF in rats. There is no RCF related increase in lung tumors at 3, 9, or 16 mg/m³. A pleural fibrosis and mesothelioma were seen in a single rat in the mid-dose (9 mg/m³) group. In addition, no consistently diagnosed fibrosis was seen below 9 mg/m³. Pulmonary fibrosis was observed at 9 and 16 mg/m³.

¹ Lockey, J.E., Lemasters, G.K., Rice, C.H., McKay, R.T., et al. (1994) Epidemiological Study Assessing Respiratory Effects of Workers Exposed to Ceramic Fibers, Department of Environmental Health, University of Cincinnati, College of Medicine.

² Mast, R.W., McConnell, E.E., Anderson, R. et al. (1993) Studies on the Chronic Toxicity (Inhalation) of Four Types of Refractory Ceramic Fiber in Male Fischer 344 Rats. Submitted for publication.

³ Glass, L.E., Mast, R.W., Hesterberg, T.H., et al. Inhalation Oncogenity of Refractory Ceramic Fiber (RCF) in Rats – Final Results. (1992) The Toxicologist.

⁴ Mast, R.W., McConnell, Hesterberg, T.H., et al. (1993) A Multiple Dose Chronic Inhalation Toxicity of Size Selected Kaolin Refractory Ceramic Fiber (RCF) in Male Fischer 344 Rats. Submitted for publication.

⁵ Mast, R.W., McConnell, Hesterberg, T.H., et al. (1993) A Multiple Dose Chronic Inhalation Toxicity Study of Kaolin Refractory Ceramic Fiber (RCF) in Male Fischer 344 Rats. Submitted for publication.

SECTION XII – Ecological Information

No data available on any adverse effects of this material on the environment.

SECTION XIII – Disposal Information

Waste Management/Disposal: This product does not exhibit any characteristics of a hazardous waste. It is recommended that the product should be contained in bags or suitable closed containers to prevent creating any airborne dust during the disposal. The product is suitable for landfill disposal. However, debris generated during installation, maintenance or tear-out procedures may be contaminated with other hazardous materials. Therefore, appropriate waste analysis may be necessary to determine proper disposal. Waste characterization and disposal/treatment methods should be determined by a qualified environmental professional in accordance with applicable federal, state and local regulations.

SECTION XIV – Transport Information

US Department of Transportation: Not regulated by DOT as a hazardous material. No hazard class, no label or placard required no UN or NA number assigned.

Canadian TDG Hazard Class & PIN: Not regulated

SECTION XV – Regulatory Information

SARA Title III: This product does not contain any substances reportable under Sections 302, 304, and 313. Sections 311 and 312 do apply (Routine Reporting and Chemical Inventories)

TSCA: All substances in this product are listed in the chemical substance inventory [Section 8(b)].

Refractories, fibers, aluminosilicate (RCF) CAS# 142844-00-6 is subject to the TSCA Export Notification Requirements [Section 12(b)] of TSCA

OSHA: Comply with Hazard Communication Standard 29 CFR 1910.134 and 29 CFR 1926.103. Also, Respiratory Protection Standard 29 CFR 1910.134 and 29 CFR 1926.103.

CALIFORNIA: Listed as “Ceramic Fibers (airborne particles of respirable size)” Proposition 65 and The Safe Drinking Water and Toxic Enforcement Act of 1986.

SECTION XVI – Other Information

Special Precautions:

Product which has been in service above 1800°F (982°C) may undergo partial conversion to cristobalite, a form of crystalline silica which presents a health hazard if inhaled over long periods of time. Cristobalite is classified as a probable human carcinogen by IARC, Group 2A

After-Service RCF Removal Precautions:

1. Employees should be appraised of the hazards and proper conditions and precautions for safe use or exposure.
2. NIOSH-approved respirators, in accordance with requirements of 29 CFR 1910.134 should be used according to the above guidelines for dust levels above the OSHA PEL (8-hour TWA) of 0.05 mg/m³ for cristobalite.
3. Dust generation should be minimized by the use of dust control equipment or water spray when feasible.
4. Wear protective clothing and vacuum clean prior to removing clothing.

5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA – AVOID BREATHING DUST – DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

Acronyms and References Used in Preparation of MSDS:

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS#:	CAS Registration Number is an assigned number to identify a material. CAS stands for Chemical Abstracts Service.
F/cc:	Fibers per cubic centimeter
HMIS™:	Hazardous Materials Identification System (National Paint & Coatings Association)
IARC:	International Agency for Research on Cancer
MSHA:	Mine Safety and Health Administration
Mg/m ³ :	Milligrams per cubic meter
NIOSH:	National Institute for Occupational. Safety and Health
NFPA:	National Fire Protection Association
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limit (OSHA)
RCF:	Refractory Ceramic Fiber
REL:	Recommended Exposure Limit (NIOSH)
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
Section 311 & 312:	Community Right-to-Know, MSDSs & Chemical Inventory
Section 313:	Toxic Chemicals, Toxic Chemical Release Reporting, Form R
TLV:	Threshold Limit Values (ACGIH)
TWA:	Time Weighted Average
29CFR1910.134:	OSHA Respiratory Protection Standard

References:

- Sax, N. Irving: Dangerous Properties of Industrial Materials, Seventh Edition, Van Nostrand Reinhold Co., Inc, 1989.
- Kirk, R. and Othmer, D., Encyclopedia of Chemical Technology, Third Edition, Wiley – Interscience, New York, NY 1982.
- Clansky, K.B., Suspect Chemicals Sourcebook, 1992-2 Edition, Roytech Publications, Bethesda, Maryland.
- Sax, N. Irving and Lewis, R.J. Hawley's Condensed Chemical Dictionary, Eleventh Ed., Van Nostrand Reinhold Co., Inc., NY.
- Manufacturers/Suppliers, Material Safety Data Sheets on Raw Materials Used.

Revisions: This MSDS consolidates previous MSDS Nos. F009, F012, F013, F014, F015, F024, F046 and F059 into MDS No. FA100

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