

Manufacturer: Lindberg, A Unit of General Signal
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 Watertown, WI 53094
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Revision Date: November 6, 1992 Replaces MSDS dated: August 14, 1987

Completed by: Lindberg Unit Environmental, Safety, and Health Department

I. PRODUCT IDENTIFICATION			
Trade Name: Moldatherm II ® Insulation (Also known as Moldatherm ® Insulation)			
Synonyms: Refractory Ceramic Fibers (RCFs); Ceramic Fiber; Man-Made Vitreous Fibers (MMVF); Mullite; High Alumina Ceramic Fiber			
Chemical Family: Vitreous Aluminosilicate Fibers			
Molecular Formula: $Al_2O_3 \cdot SiO_2$			
II. PRODUCT COMPOSITION			
Component	CAS No.	Percent (%)	Exposure Limits (8 hr. TWA)
Aluminosilicate	NA—Mixture	79 to 99	1.0 fibers/cc**
Silica, amorphous	7631-86-9	1 to 21	10 mg/m ³ ACGIH/TLV 6 mg/m ³ OSHA/PEL
Remaining components not determined hazardous and/or other components present at less than 1.0% (0.1% for carcinogens). **NOTE: No OSHA or ACGIH exposure limits have been established for this material. The user is advised to follow the Lindberg Recommended Exposure Limit (REL). (See Section VII. Personal Protective Equipment) Moldatherm® insulation will partially convert to cristobalite (CAS No. 14464-46-1), a form of crystalline silica, at operating temperatures at or above 1800 °F. The rate and percentage of conversion to cristobalite is time and temperature dependent. (See Section X. Special Precautions/ Supplemental Information.) Cristobalite has an OSHA permissible exposure limit (PEL) and ACGIH threshold limit value (TLV) of 0.05 mg/m³ (respirable dust).			
III. PHYSICAL DATA			
Boiling Point:	NA	Vapor Pressure:	NA
Evaporation Rate:	NA	% Volatile	NA
Melting Point:	Greater than 3000°F	Odor/Physical Description:	White, odorless solid

IV. FIRE AND EXPLOSION DATA			
Flash Point:	NA	Flammable Limits (LEL & UEL):	NA
Unusual Fire or Explosion Hazards:	None	Extinguishing Media:	NA
Fire Fighting Procedures:	Use extinguishing media suitable for surrounding fire.		
V. HEALTH HAZARDS			
A. Health:	WARNING! MAY BE IRRITATING TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE HARMFUL IF INHALED. POSSIBLE CANCER HAZARD BY INHALATION. Contains refractory ceramic fibers which MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure. (See Section X. for information concerning additional hazards after high temperature operation.)		
B. Ingestion:	Ingestion is unlikely. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain and diarrhea.		
C. Skin:	Slightly to moderately irritating. May cause irritation, inflammation and rash.		
D. Eye:	Slightly to moderately irritating. Abrasive action may cause damage to the outer surface of the eye.		
E. Inhalation:	May irritate respiratory tract. Pre-existing medical conditions, especially chronic bronchial or lung disease may be aggravated by exposure.		
F. Toxicity:	Existing toxicology and epidemiology data are preliminary and the results presented below have not been validated by scientific review.		
G. Epidemiology:	There are no known published reports of negative health affects of workers exposed to refractory ceramic fibers (RCFs). Studies of RCF production workers continues. Preliminary evidence, reportedly obtained from employees in RCF manufacturing faciities, indicates the following: 1. There is no evidence on x-rays of any fibrotic lung disease of RCF manufacturing employees. 2. There is no evidence of any lung disease among those employees exposed to RCF that never smoked. 3. A statistical trend of slightly decreased pulmonary function was observed in the exposed population of workers based on the duration of RCF exposure. The statistic showing decreased pulmonary function was within the normal range and/or was insignificant.		

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. Plaques are not "pre-cancer" nor are they associated with any measurable effect on lung function.

H. Toxicology:

Several health effect studies of inhalation exposure of rats and hamsters are now reaching completion. In a lifetime nose-only inhalation study, rats exposed to a very high dose of 30 mg/m³ (200 fibers/cc) developed progressive lung damage (interstitial fibrosis) and cancers of the lung and of the pleura (lining of the chest wall and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma.

A multiple dose study (3, 9, 16 mg/m³ or 25, 75, 150 fibers/cc, respectively) is currently ongoing in rats. After 24 months of exposure, only reversible cellular changes have been seen in the low dose group. At 9 mg/m³ (75 fibers/cc), areas of lung fibrosis are barely discernible and at 16 mg/m³ (150 fibers/cc) both lung and pleural fibrosis are present.

At this time, no lung or pleural cancer has been seen in the multiple dose study. This information will be updated once the study is completed.

In 1987, the International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool). IARC classified ceramic fiber, fibrous glasswool and mineral wool (rockwool and slagwool) as possible human carcinogens (Group 2B).

VI. EMERGENCY AND FIRST AID PROCEDURES

Ingestion: Drink extra water. Allow for natural gastrointestinal elimination. Get medical attention if gastrointestinal symptoms develop (see Section V.).

Skin Contact: Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Do not rub or scratch exposed skin. A skin cream or lotion used after washing may be helpful. Seek medical attention if irritation persists.

Eye Contact: Immediately rinse eyes with water. Remove any contact lenses, and continue flushing eyes with running water for at least 15 minutes. Do not rub eyes. Hold eyelids apart to ensure rinsing of the entire surface of the eyes and lids with water. Get immediate medical attention.

Inhalation: Remove exposed person to fresh air. Seek medical attention if shortness of breath, cough, wheezing or chest pain develop. If breathing is labored, administer oxygen until medical assistance can be rendered.

VII. PERSONAL PROTECTIVE EQUIPMENT

Eyes: Wear safety glasses or chemical goggles. Contact lenses should not be worn unless chemical goggles are also used and care is taken to not touch the eyes with contaminated body parts or materials.

Skin: Wear gloves, hats and full body covering to prevent skin irritation as necessary (see Section X.).

Respiratory Protection:

Use of properly designed and operating engineering controls is recommended and preferred over respiratory protection for controlling airborne dust and fiber concentrations.

If exposures exceed our Recommended Exposure Limit (REL) of 1.0 fibers/cc of air (8 hour TWA) respiratory protection as outlined below must be used. Also, use respiratory protection if throat irritation is experienced. When airborne concentrations are unknown or exceed 0.5 f/cc, use of a half face respirator described below is recommended. Respiratory protection is necessary if the material has been exposed to temperatures at or above 1800 °F. (See Section X.). Use only NIOSH/MSHA approved respirators.

Concentration (8 hour TWA)	Minimum Acceptable Respirator Type
0 to 0.5 f/cc	Optional disposable dust respirator
0.5 f/cc to 5 f/cc or up to 10 times the OSHA PEL for cristobalite	Half face, air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges
5 to 25 f/cc or up to 50 times the OSHA PEL for cristobalite (2.5 mg/m ³)	Full face, air-purifying respirator with high-efficiency particulate air (HEPA) filter cartridges or powered air-purifying respirator (PAPR) equipped with HEPA filter cartridges
Greater than 25 f/cc or 50 times the OSHA PEL for cristobalite (2.5 mg/m ³)	Full face, positive pressure supplied air respirator

As minimum protection, use half-mask air-purifying respirators equipped with HEPA filter cartridges if airborne fiber levels or cristobalite concentrations are not known.

PLEASE NOTE:

Employees must be given instruction, fit testing, medical evaluation, and training per 29 CFR 1910.134 and your company's written respirator program if respiratory protection is used. Appropriate respirator selection must be a part of the respirator program. The above respirator recommendations are general guidelines only and may not be appropriate for certain applications. Please consult with your safety or industrial hygiene staff or consultants.

VIII. REACTIVITY DATA

Stability/Incompatibility: Stable under normal conditions of use. Soluble in hydrofluoric acid, phosphoric acid and concentrated alkali.

Hazardous Reactions/Decomposition Products: NONE

IX. ENVIRONMENTAL AND REGULATORY INFORMATION**Spill or Leak Procedure:**

Use vacuums equipped with HEPA filters to clean up spilled material. Wet sweeping is also acceptable.

Waste Disposal:

This waste is not specifically listed as a hazardous waste under Federal regulations. However, it could be characteristically hazardous if it is considered toxic, corrosive, ignitable, or reactive according to Federal definitions (40 CFR 261). Additionally, it could be designated as hazardous or a special waste according to state regulations. This substance could also become a hazardous waste if it is mixed with or otherwise comes in contact with hazardous waste. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate.

The transportation, storage, treatment, and disposal of this waste material must be conducted in compliance with all applicable Federal, state, and local environmental regulations.

SARA Title III Information:

This material is designated a "delayed hazard" per the Superfund Amendments and Reauthorization Act (SARA) Section 311/312 (40 CFR 370).

This product does not contain any toxic chemicals subject to the reporting requirements of SARA Section 313 (40 CFR 372).

This product contains ceramic fibers which are on the State of California "Proposition 65" list (Safe Drinking Water and Toxic Enforcement Act of 1986).

The Canadian Workplace Hazardous Materials Information System (WHMIS) category of "Other Toxic Effects" applies to this product.

This product is not a DOT listed hazardous material. Use product name for bill of lading description.

Some states have "special waste" regulations or other regulations which may apply to this product. Consult with your state environmental regulatory authorities.

X. SPECIAL PRECAUTIONS/SUPPLEMENTAL INFORMATION**Handling/Storage:**

Moldatherm® insulation should be handled with caution. Follow the personal protective equipment recommendations detailed in Section VII. Special precaution should be taken to avoid unnecessary cutting and tearing of the material to minimize generation of airborne dust.

Clothing:

Full body clothing is recommended to reduce the possibility of skin irritation. If possible, do not take unwashed work clothes home. Work clothes should be washed separately from other clothing. Rinse the washing machine thoroughly after laundering the work clothes. Inform your launderer of this cleaning procedure.

Cristobalite:

Product which has been in service at elevated temperatures (at or above 1800 °F) over time may undergo partial conversion to cristobalite, a form of crystalline silica. This reaction occurs at the furnace lining hot face. As cristobalite is formed, Moldatherm[®] insulation becomes more friable; special caution must be taken to minimize generation of airborne dust. The amount of cristobalite formed will vary based on the operating temperature and length of service. (The IARC classification for crystalline silica is a group 2A carcinogen (probable human carcinogen). Cristobalite (crystalline silica) is also listed by NTP as a carcinogen.)

WARNING! DUST CAN CAUSE SEVERE RESPIRATORY DISEASE. DUST MAY BE IRRITATING TO SKIN, EYES, AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD BY INHALATION. Cristobalite (crystalline silica) MAY CAUSE CANCER.

The OSHA permissible exposure limit (PEL) and the ACGIH threshold limit value (TLV) for cristobalite is 0.05 mg/m³ (respirable dust). Use NIOSH/MSHA approved respirators when airborne exposure limits may be exceeded. (See Section VII. table for respirator selection.)

Removal or Tearout of Moldatherm[®] Insulation:

Insulation surfaces should be lightly sprayed with water before removal to suppress airborne dust. Spray additional water as water evaporates during removal. A surfactant may aid the wetting process.

After removal of the Moldatherm[®] insulation is complete, dust suppressing cleaning methods, such as wet sweeping or vacuuming should be used to clean the work area. If dry vacuuming is used, the vacuum must be equipped with a HEPA filter. Air blowing or dry sweeping should not be used. Dust suppressing components can be used to clean up light dust.

Do not reuse product packaging because of possible product residue.

NOTICE: The information presented here 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, nor is any authorization given or implied to practice any patented invention without a license. No responsibility can be assumed by 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.

LINDBERG
A UNIT OF GENERAL SIGNAL

May 27, 1993

Dear Customer:

Lindberg is a recognized leader in the manufacture of a wide range of quality products used in the thermal processing of materials for industry and research. Lindberg manufactures and sells Moldatherm II^R insulation, an energy conserving refractory ceramic fiber (RCF) product. Moldatherm II^R Insulation is available in module form and/or built into Lindberg furnace and oven products.

It is our responsibility to inform our customers of any potential hazards of our products as part of our corporate duty and commitment to our customers as well as to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200).

A new material safety data sheet (MSDS) and appropriate warning labels have been prepared (attached) to communicate to you the latest information on how to safely use our products.

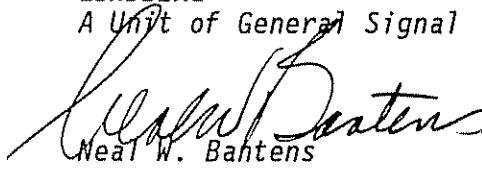
Please carefully review the information contained in the attached MSDS for Moldatherm^R Insulation. This new MSDS supersedes all previously published MSDSs for Moldatherm II^R Insulation. Please contact your local Lindberg representative or the Environmental, Safety, and Health Manager if you have any other questions regarding the safe use of Moldatherm II^R Insulation at:

Lindberg/Blue M
2218 W. 138th Street
Blue Island, IL 60406
(708) 385-9000

Lindberg sincerely values your business and looks forward to working with you in the future.

Sincerely,

LINDBERG
A Unit of General Signal


Neal W. Bantens
Vice President/Human Resources

NWB:d1k

Attachments