



MATERIAL SAFETY DATA SHEET

MSDS No. M03001 Rev 2

Effective Date: 05/25/2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Group: SOLUBLE CERAMIC FIBER PRODUCT
Chemical Name: AMORPHOUS MAGNESIUM SILICATE FIBER
Synonym(s): High Index Fiber, Alkaline Earth Silicate
Trade Names: DynaGuard™ Flexible Microporous Insulation, DynaGuard™ Flexible Tapes, DynaGuard Composite

Manufacturer/Supplier: ThermoDyne Corp
822 Middlebury St.
Elkhart, IN 46516

Inquiries: 574.522.3606
(Monday – Friday 8:00 a.m. – 10:00 p.m. EST)

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>COMPONENTS</u>	<u>CAS NUMBER</u>	<u>% BY WEIGHT</u>
Silica, amorphous, fumed	69012-64-2	50-80
Titanium dioxide	13463-67-7	10-35
Silicon Carbide	409-21-2	10-35
Continuous filament fiberglass	65997-17-3	5-30
Fibers, Magnesium silicate	Simple Mixture	5-30

(See Section 8 “Exposure Controls / Personal Protection” for exposure guidelines)

3. HAZARDS IDENTIFICATION

OTHER POTENTIAL EFFECTS

TARGET ORGANS:

Respiratory Tract (nose & throat), Eyes, Skin

RESPIRATORY TRACT (nose & throat) IRRITATION:

If inhaled in sufficient quantity, may cause temporary, mild mechanical irritation to respiratory tract. Symptoms may include scratchiness of the nose or throat, cough or chest discomfort.

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.

GASTROINTESTINAL IRRITATION:

Unlikely route of exposure

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

FIRST AID PROCEDURES

RESPIRATORY TRACT (nose & throat) IRRITATION:

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 IRRITATION:

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 IRRITATION:

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.

GASTROINTESTINAL IRRITATION:

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

NOTES TO PHYSICIAN:

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

5. FIRE FIGHTING MEASURES

NFPA Unusual Hazards:	None
Flammable Properties:	None
Flash Point:	None
Hazardous Decomposition Products:	None

Unusual Fire and Explosion Hazard: None
Extinguishing Media: Use extinguishing media suitable for type of surrounding fire

6. ACCIDENTAL RELEASE MEASURES

SPILL PROCEDURES

Provide workers with respirators, if needed. [See Section 8]
Limit airborne dust dispersion by wetting the materials with water.

CLEAN UP

Use high efficiency vacuum to clean up spilled material. Use wet sweeping or a dust suppressant where sweeping is necessary. Do not use compressed air for clean up.

ENVIRONMENTAL PROTECTION

Clean up spilled material to the extent possible. Package spilled material properly for disposal. Do not allow to be wind-blown. Do not flush spilled material into drains. Prevent spilled materials from entering natural water courses. Check with your employer to identify all regulations which may apply.

7. HANDLING AND STORAGE

STORAGE

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

HANDLING

Minimize airborne dusts by avoiding the unnecessary disturbance of materials.

CLEAN-UP

Clean up dust carefully. Use wet sweeping or high efficiency vacuum to remove dust. Do not use compressed air.

During after-service removal activities, wet exposed material frequently to minimize airborne dust. A surfactant may be added to the water to improve the wetting process. Use only enough water to wet the insulation. Do not allow water to accumulate on floors. [See Section 16 – After Service Removal]

EMPTY CONTAINERS

Product packaging may contain residue. Do not reuse.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

INDUSTRIAL HYGIENE STANDARDS AND OCCUPATIONAL EXPOSURE LIMITS

Components OSHA SUPPLIER

Magnesium silicate fiber None established * See below **

ACGIH TLV's: Magnesium silicate fiber – None established.

* For magnesium silicate fiber, refer to OSHA guidance regarding “Particulates Not Otherwise Regulated” (PNOR). Control airborne dust levels as follows:

Components Particle Size OSHA

PNOR Total Dust 15 mg/m³

Respirable Dust 5 mg/m³

ACGIH Particulates Not Otherwise Classified (PNOC) – Inhalable particulate: 10 mg/m³. Respirable particulate: 3 mg/m³.

** As with most industrial materials, it is prudent to minimize unnecessary exposure to respirable dusts. Note that Industrial hygiene standards and occupational exposure limits differ between countries and local jurisdictions. Check with your employer to identify any “respirable dust”, “total dust” or “fiber” exposure standards to follow in your area. If no regulatory dust or fiber control standard apply, a qualified industrial hygiene professional can assist with a specific evaluation of workplace conditions and the identification of appropriate respiratory protection practices. In the absence of other guidance, the supplier has found that it is generally feasible to control occupational fiber exposure to 1 f/cc or less.

ENGINEERING CONTROLS:

Dust suppressing control technologies such as local exhaust ventilation, point of generation dust collection, down draft work stations, emission controlling tool designs, and materials handling equipment are effective means of minimizing airborne fiber emissions.

PERSONAL PROTECTION EQUIPMENT

Eye Protection:

In case of overhead work, wear goggles or safety glasses with side shields to prevent eye contact.

Skin Protection:

Wear gloves, head coverings and full body clothing as necessary to prevent skin irritation.

Respiratory Protection:

When effective engineering and/or administrative controls are insufficient, the use of appropriate respiratory protection, pursuant to the requirements of OSHA 1910.134, is recommended. For dust concentrations below applicable exposure limit value, PPE is not required. 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

OXIDIZING PROPERTIES:	None
ODOR:	None
MELTING POINT:	1500 - 1550°C (2730 - 2820°F)
FLAMMABILITY:	None
EXPLOSIVE PROPERTIES:	None

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:	Stable under conditions of normal use
CONDITIONS TO AVOID:	Avoid direct contact with strong acid environments
HAZARDOUS DECOMPOSITION PRODUCTS:	None
HAZARDOUS POLYMERIZATION:	Not Applicable

11. TOXICOLOGICAL INFORMATION

EPIDEMIOLOGY

This product has not been the subject of epidemiological study. Epidemiological studies related to other fiber chemistries of similar solubility have not identified a statistically significant incidence of exposure-related respiratory disease.

TOXICOLOGY

This product has been the subject of limited testing.

A review of available scientific literature suggests an inverse relationship between dissolution rate and potential health effects; i.e. the higher the dissolution rate of a fiber the lower its potential to produce health effects. The dissolution rate of magnesium silicate fibers have been determined through standardized *in vitro* testing. The dissolution rate of magnesium silicate fibers is higher than that of other fiber types that have been tested in chronic animal studies and did not produce respiratory disease.

This product possesses a fiber chemistry within the regulatory (European Commission Directive 97/69/EC) definition as a "man-made vitreous (silicate) fiber with random orientations with alkaline oxide and alkaline earth oxide (Na₂O + K₂O + CaO + MgO + BaO) content greater than 18% by weight". Magnesium silicate

fibers have been tested pursuant to EU protocol ECB/TM/26, rev. 7, Nota Q, Directive 97/69/EC. The results for the short term biopersistence test by inhalation (IH test) was 6 days; well below the regulatory threshold of 10 days cited in Directive 97/69/EC. Based on testing results, magnesium silicate fiber based products are not regarded as potential carcinogens and they ARE EXEMPT from European classification as such. By virtue of these test results, these products ARE EXEMPT from regulatory guidelines that require hazard warning labels with specific risk phrases citing respiratory disease potential. In addition, magnesium silicate fibers have been tested in an independent laboratory, by intratracheal (IT test) instillation, under a protocol that was consistent with the requirements of the German Hazardous Substances Ordinance (BGBI. I pp. 1782, 2049, Third Amendment, Appendix V, No. 7). The half-life clearance of magnesium silicate fibers was 32.7 days; well below the applicable regulatory thresholds. Based on the IT test results, magnesium silicate fiber products ARE EXEMPT from the requirements of the German Ordinance.

The definition of “irritant” contained in the hazard communication standard, 29 CFR 1900.1200, Appendix A, is “... a reversible inflammatory effect on living tissue by chemical action...”. Magnesium silicate fiber is an inert material which doesn’t interact chemically with exposed skin. However, there is a possibility that exposure to this product may cause temporary mechanical irritation to the eyes, skin or respiratory tract (nose, throat, lungs). This temporary irritation can be mitigated with proper handling practices designed to limit exposure and the use of protective clothing (glasses, gloves, clothing).

This product has not been specifically evaluated by any regulatory authority or other classification entity, such as the International Agency for Research on Cancer (IARC) or the National Toxicology Program (NTP). Other types of man-made vitreous fibers (MMVF) have been evaluated and subsequently classified as potential carcinogens. Various classifications, such as “possible carcinogen”, “probable carcinogen”, and “reasonably anticipated to be a carcinogen” have been given to other MMVF’s.

12.ECOLOGICAL INFORMATION

No ecological concerns have been identified.

13.DISPOSAL CONSIDERATIONS

As produced, this product is usually accepted for disposal at most sites licensed for the disposal of industrial waste. Check applicable regulations and waste site policies prior to disposal. Waste should be placed in sealed containers for disposal.

In case of contamination, by other materials classified as hazardous waste, expert guidance should be sought.

14.TRANSPORT INFORMATION

Product should remain in sealed containers during transportation.

15.REGULATORY INFORMATION

Key statutory and regulatory classification or listings for the product, as manufactured, which may impact product storage, use handling or disposal:

UNITED STATES FEDERAL REGULATIONS

SARA TITLE III: This product is not regulated under SARA Sections 302, 304, 311/312 and 313.

**Comprehensive Environmental Response
Compensation and Liability Act of 1980 (CERCLA):**

ThermoDyne DynaGuard™ microporous products are composed of magnesium silicate fibers with an average diameter of greater than 1 micron, and therefore are not considered CERCLA hazardous substances. See 60 FR 30934 (June 12, 1995).

Clean Air Act (CAA):

ThermoDyne DynaGuard™ microporous products are composed of magnesium silicate fibers with an average diameter of greater than 1 micron, and therefore are not considered hazardous air pollutants. See 60 FR 30934 (June 12, 1995).

Toxic Substances Control Act (TSCA):

All substances in this product are listed, as required, on the TSCA inventory.

UNITED STATES STATE REGULATIONS

California: Magnesium silicate fiber has not been listed by the State of California on Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986.

New Jersey: Magnesium silicate fiber is not listed as a special health hazard substance as defined in New Jersey Worker and Community Right to Know Act, New Jersey Administrative Code, Title 8, Department of Health, Chapter 59, Subchapter 10.

Pennsylvania: Magnesium silicate fiber is not listed as a special health hazard substance as defined in Pennsylvania Right-to-Know Law, Section 3800.

INTERNATIONAL REGULATIONS

Canada:

Canadian Workplace Hazardous Materials Information System (WHMIS) - No Canadian Workplace Hazardous Materials Information System (WHMIS) categories apply to this product.

Canadian Environmental Protection Act (CEPA) – All substances in this product are listed, as required, on the Domestic Substance List (DSL). No chemicals in this product are listed on the Non-Domestic Substances List.

European Union:

European Directive 97/69/EC – By virtue of testing results, magnesium silicate fiber has been exempted from classification and labeling as a potential carcinogen.

German Hazardous Substances Ordinance – By virtue of testing results, magnesium silicate fiber may be used without the limitations or concern for requirements imposed on other man-made mineral fibers by the Ordinance.

16. OTHER INFORMATION

After-Service Magnesium Silicate Thermal Insulation: Removal

As produced, the magnesium silicate fibers included in ThermoDyne's DynaGuard™ microporous insulation systems are vitreous (glassy) materials which do not contain crystalline silica. Continued exposure to elevated temperatures can cause the vitreous magnesium-silicate (alkaline-earth-silicate) fibers to devitrify (become crystalline). Clinoenstatite is the first crystalline formation to occur at approximately 1472°F (800°C). Clinoenstatite formation peaks at approximately 1832°F (1000°F), after which Protoenstatite (compositionally the same as Clinoenstatite) begins to form. Crystalline phase silica (Cristobalite) formation is possible at temperatures of approximately 2192°F (1200°C), however, the formation of crystalline silica is highly dependent on temperature, the duration of time that the fibers are exposed to high temperatures, fiber chemistry and/or the presence of fluxing agents. The formation of crystalline silica can only be confirmed 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".

During removal operations, the use of a full face respirator is recommended to reduce inhalation exposure along with eye & 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. For more detailed information regarding respirable crystalline silica, call ThermoDyne's Engineering Dept. at toll-free: 866.741.5458.

DEFINITIONS

ACGIH:	American Conference of Governmental Industrial Hygienists
ADR:	Carriage of Dangerous Goods by Road (International Regulation)
CAA:	Clean Air Act
CAS:	Chemical Abstracts Service
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
DSL:	Domestic Substances List
EPA:	Environmental Protection Agency
EU:	European Union
F/cc:	Fibers per cubic centimeter
HEPA:	High Efficiency Particulate Air
HMIS:	Hazardous Materials Identification System
IARC:	International Agency for Research on Cancer
IATA:	International Air Transport Association
IMDG:	International Maritime Dangerous Goods Code
Mg/m³:	Milligrams per cubic meter of air
Mmpcf:	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:	Particulates Not Otherwise Regulated
RCFC:	Refractory Ceramic Fibers Coalition
RCRA:	Resource Conservation and Recovery Act
REG:	Recommended Exposure Guideline (RCFC)
REL:	Recommended Exposure Limit (NIOSH)
RID:	Carriage of Dangerous Goods by Rail (International Regulations)
SARA:	Superfund Amendments and Reauthorization Act
SARA Title III:	Emergency Planning and Community Right to Know Act
SARA Section 302:	Extremely Hazardous Substances
SARA Section 304:	Emergency Releases
SARA Section 311:	MSDS/List of Chemicals and Hazardous Inventory
SARA Section 312:	Emergency and Hazardous Inventory
SARA Section 313:	Toxic Chemicals and Release Reporting
STEL:	Short Term Exposure Limit
SVF:	Synthetic Vitreous Fiber
TDG:	Transportation of Dangerous Goods
TLV:	Threshold Limit Value (ACGIH)
TSCA:	Toxic Substance Control Act
TWA:	Time Weighted Average
WHMIS:	Workplace Hazardous Materials Information System (Canada)

MSDS Prepared By: ThermoDyne Corp. (RJM)

DISCLAIMER

The information presented herein is presented in good faith and believed to be accurate as of the effective date of the Material Safety Data Sheet. Employers may use this MSDS to supplement other information gathered by them in their efforts to assure the health and safety of the employees and the proper use of the product. This summary of the relevant data reflects professional judgment; employers should note that information perceived to be less relevant has not been included in this MSDS. Therefore, given the summary nature of this document, ThermoDyne does not extend any warranty (expressed or implied), assume any responsibility, or make any representation regarding the completeness of this information or its suitability for the purposes envisioned by the user.