



SAFETY DATA SHEET

SDS No. M0516

Effective Date: 12/14/2017

1. IDENTIFICATION

- (a) Product identifier used on the label **GLASS MICROFIBER A, B & C**
- (b) Other means of identification **Special purpose glass fiber**
- (c) Recommended use of the chemical and restrictions on use **Primary Use:** Manufacture of glass fiber papers used in aircraft and aerospace insulation, as battery separators, and in filtration products.
Uses Advised Against: Spraying of dry product.
- (d) Name, address, and telephone number **Unifrax I LLC
600 Riverwalk Parkway, Suite 120
Tonawanda, NY 14150**

**Product Stewardship Information Hotline
1-800-322-2293 (Monday - Friday 8:00 a.m. - 4:30 p.m. EST)**

For additional SDSs, visit our web page, <http://www.unifrax.com> or call Unifrax Customer Service at (716) 768-6500
- (e) Emergency Phone Number: **CHEMTREC will provide assistance for chemical emergencies. Call 1-800-424-9300**

2. HAZARDS IDENTIFICATION

(a) Classification of the chemical

The U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) 2012 indicates that IARC Group 2B corresponds to OSHA HCS 2012 Category 2 carcinogen classification (see, e.g., §1910.1200, Appendix F, Part D). WHMIS 2015 Carcinogenicity Category 2.

(b) Signal word, hazard statement(s), symbol(s) and precautionary statement(s)

Hazard Pictogram



Signal Word

Warning

Hazard Statements

Suspected of causing cancer by inhalation.

Precautionary statements

Do not handle until all safety instructions have been read and understood.
 Use respiratory protection as required; see section 8 of the Safety Data Sheet.
 If concerned about exposure, get medical advice.
 Store in a manner to minimize airborne dust.
 Dispose of waste in accordance with local, state and federal regulations.

Supplementary Information

May cause temporary mechanical irritation to exposed eyes, skin or respiratory tract.
 Minimize exposure to airborne dust.

(c) Describe any hazards not otherwise classified that have been identified during the classification process

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

(d) Mixture rule

Not applicable.

3. COMPOSITION / INFORMATION ON INGREDIENTS

GLASS COMPOSITION	A-GLASS (%)	B-GLASS (475) (%)	C-GLASS (%)
SiO ₂	69.0 - 72.0	55.0 - 60.0	63.0 - 67.0
Al ₂ O ₃	2.5 - 4.0	4.0 - 7.0	3.0 - 5.0
Fe ₂ O ₃	< 0.2	<0.2	<0.2
ZnO	0-2.0	2.0 - 5.0	< 0.1
F ₂	-	< 1.0	< 1.0
B ₂ O ₃	< 0.09	8.0 - 11.0	4.0 - 7.0
Na ₂ O	10.5 - 12.0	9.5 - 13.5	14.0 - 17.0
K ₂ O	4.5 - 6.0	1.0 - 4.0	0-2.0
CaO	5.0 - 7.0	1.0 - 5.0	4.0 - 7.0
MgO	2.0 - 4.0	0.0 - 2.0	2.0 - 4.0
BaO	-	3.0 - 6.0	< 0.1

(a) Chemical and (b) Common Name

Glass, oxide, chemicals*

(c) CAS Number

65997-17-3**

% BY WEIGHT

100

***Synonyms:** special purpose glass fiber, synthetic vitreous fiber (SVF), man-made vitreous fiber (MMVF), man-made mineral fiber (MMMMF)

**This CAS number corresponds to a wide range of glass fibers, including special-purpose glass fiber.

(d) Impurities and stabilizing additives

Not applicable.

4. FIRST AID MEASURES

(a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion

SKIN

Handling of this material may generate mild mechanical temporary skin irritation. If this occurs, 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.

(b) Most important symptoms/effects, acute and delayed

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

(c) Indication of immediate medical attention and special treatment needed, if necessary

NOTES TO PHYSICIANS

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

5. FIRE FIGHTING MEASURES

(a) Suitable (and unsuitable) extinguishing media

Use extinguishing agent suitable for surrounding combustible materials.

(b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products):

Non-combustible products, class of reaction to fire is zero.
Packaging and surrounding materials may be combustible.

(c) Special protective equipment and precautions for fire-fighters

NFPA Codes: Flammability: 0 Health: 1 Reactivity: 0 Special: 0

6. ACCIDENTAL RELEASE MEASURES

(a) Personal precautions, protective equipment, and emergency procedures

Minimize airborne dust. Compressed air or dry sweeping should not be used for cleaning. See Section 8 "Exposure Controls / Personal Protection" for exposure guidelines.

(b) Methods and materials for containment and cleaning up

Frequently clean the work area with appropriately 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.

7. HANDLING AND STORAGE

(a) Precautions for safe handling

Handle fiber carefully to minimize airborne dust. Limit use of power tools unless in conjunction with local exhaust ventilation. Use hand tools whenever possible.

(b) Conditions for safe storage, including any incompatibilities

Store in a manner to minimize airborne dust.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

(a) OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available

<u>Components</u>	<u>OSHA PEL</u>	<u>NIOSH REL</u>	<u>ACGIH TLV</u>	<u>MANUFACTURER REG</u>
Glass Micro Fiber	None established*	None established	None established	See Below**

*There is no specific regulatory standard for Glass Micro Fiber in the U.S. OSHA's Particulate Not Otherwise Regulated (PNOR)+standard [29 CFR 1910.1000, Subpart Z, Air Contaminants] applies generally - Total Dust Total Dust 15 mg/m³; Respirable Fraction 5 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 0.5 f/cc or less.

Occupational exposure limits (OELs) for special purpose fibers range from 0.2 f/ml (Sweden) to 2 f/ml (UK, Poland) . typically a limit of 1 f/ml is applicable in most EU Member States.

(b) Appropriate 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.

(c) Individual protection measures, such as personal protective equipment

Skin Protection

Wear personal protective equipment (e.g gloves), 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, employees should be informed on best practices to minimize non-work dust exposure (e.g., vacuum clothes before leaving the work area, wash work clothing separately, and rinse washer before washing other household clothes).

Eye Protection

As necessary, wear goggles or safety glasses with side shields.

Respiratory Protection

When engineering and/or administrative controls are insufficient to maintain workplace concentrations below a regulatory OEL, the use of appropriate respiratory protection, pursuant to the requirements of OSHA Standards 29 CFR 1910.134 and 29 CFR 1926.103, is recommended. A NIOSH certified respirator with a filter efficiency of at least 95% should be used. The 95% filter efficiency recommendation is based on NIOSH respirator selection logic sequence for exposure to manmade mineral fibers. Other factors to consider are the NIOSH filter series N, R or P -- (N) Not resistant to oil, (R) Resistant to oil and (P) oil Proof. These recommendations are not designed to limit informed choices, provided that respiratory protection decisions comply with 29 CFR 1910.134.

The evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed, on a case by case basis, by a qualified Industrial Hygienist.

Other Information

- 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

(a) Appearance	White	(j) Upper/lower flammability or explosive limits	Not applicable
(b) Odor	Odorless	(k) Vapor pressure	Not applicable
(c) Odor threshold	Not applicable	(l) Vapor density	Not applicable
(d) pH	Not applicable	(m) Relative density	2.4 - 2.9
(e) Melting point	1688-2228 F	(n) Solubility	Insoluble
(f) Initial boiling point and boiling range	Not applicable	(o) Partition coefficient: n-octanol/water	Not applicable
(g) Flash point	Not applicable	(p) Auto-ignition temperature	Not applicable
(h) Evaporation rate	Not applicable	(q) Decomposition temperature	Not applicable
(i) Flammability	Not applicable	(r) Viscosity	Not applicable

10. STABILITY AND REACTIVITY

(a) Reactivity	Non-reactive.
(b) Chemical stability	As supplied, is stable and inert.
(c) Possibility of hazardous reactions	None
(d) Conditions to avoid	Please refer to handling and storage advice in Section 7

- (e) **Incompatible materials** None
(f) **Hazardous decomposition products** None

11. TOXICOLOGICAL INFORMATION

(a) Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);

Exposure is predominantly by inhalation.

(b) Symptoms related to the physical, chemical and toxicological characteristics;

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

(c) Delayed and immediate effects and also chronic effects from short- and long-term exposure;

Human Data:

A case-control study did not show any association between laryngeal or hypopharyngeal cancers and microfiber exposure (Marchand 2000). In an historical cohort study (Marsh 2001), no excess cancer was observed in the special-purpose glass fiber group.

Animal Studies:

One 475 glass fiber inhalation study in rats resulted in few benign pulmonary tumors (Davis 1996). This result confirms previous experiments in which no significant increase of the tumor incidence with exposure to 475 glass was observed. Cullen (2000) found that 475 glass fibers do not induce marked macrophage reaction, alveolar fibrosis or hyperplasia.

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 475 glass is a potential carcinogen in laboratory animals. 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.

Irritant Properties

Not a chemical irritant according to test method OECD no. 404.

(d) Numerical measures of toxicity (such as acute toxicity estimates).

Not evaluated for acute toxicity.

(e) International Agency for Research on Cancer and National Toxicology Program

IARC, in in 2002, (v.81), <http://monographs.iarc.fr/ENG/Monographs/vol81/mono81.pdf> classified Special-purpose glass fibres such as E-glass and 475qglass fibres as possibly carcinogenic to humans (group 2B). IARC evaluated the possible health effects as follows:

- There is inadequate evidence in humans for the carcinogenicity of glass wool fibers.
- There is sufficient evidence in experimental animals for the carcinogenicity of special-purpose glass fibres including E-glass and 475qglass fibres.

The Annual Report on Carcinogens (latest edition), prepared by NTP, classified Certain Glass Wool Fibers (Inhalable) as "reasonably anticipated" to be a carcinogen.

<https://ntp.niehs.nih.gov/ntp/roc/content/profiles/glasswoolfibers.pdf>

Not classified by OSHA.

References:

Cullen, R. T., Searl, A., Buchanan, D., Davis, J. M. G., Miller, B. G., and Jones, A. D., (2000). Pathogenicity of a Special-Purpose Glass Microfiber (E Glass) Relative to Another Glass Microfiber and Amosite Asbestos. *Inh. Tox.* 12: 959-977.

Davis JMG et al. (1996) A comparison of methods of determining and predicting the pathogenicity of mineral fibres. *Inh. Tox.* 8:747-770.

International Agency for Research on Cancer (IARC), (2002). *Man-Made Vitreous Fibres*, Vol. 81. Lyon, France.

Marchand JL et al. (2000). Laryngeal and hypopharyngeal cancer and occupational exposure to asbestos and man-made vitreous fibres: results of a case-control study. *Am J Ind Med.* 37(6):581-589.

Marsh, G. M., Youk, A. O., Stone, R. A., Buchanich, J. M., Gula, M. J., Smith, T. J., and Quinn, M. M., (2001 a). Historical cohort study of US man-made vitreous fiber production workers: I. 1992 fiberglass cohort follow-up: initial findings. *JOEM*, 43, 9: 741-756.

12. ECOLOGICAL INFORMATION

(a) Ecotoxicity (aquatic and terrestrial, where available)	No known aquatic toxicity.
(b) Persistence and degradability	These products are insoluble materials that remain stable over time and are chemically identical to inorganic compounds found in the soil and sediment; they remain inert in the natural environment.
(c) Bioaccumulative potential	No bioaccumulative potential.
(d) Mobility in soil	No mobility in soil.
(e) Other adverse effects (such as hazardous to the ozone layer)	No adverse effects of this material on the environment are anticipated.

13. DISPOSAL CONSIDERATIONS

WASTE MANAGEMENT

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

DISPOSAL

This product, 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.

14. TRANSPORT INFORMATION

(a) UN number	Not Applicable
(b) UN proper shipping name	Not Applicable
(c) Transport hazard class(es)	Not Applicable
(d) Packing group, if applicable	Not Applicable
(e) Environmental hazards (e.g., Marine pollutant (Yes/No))	Not a marine pollutant

(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)	Not Applicable
(g) Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises	Not Applicable

Canadian TDG Hazard Class & PIN: Not regulated

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

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS

EPA	<p>Superfund Amendments and Reauthorization Act (SARA) Title III - this product does not contain any substances reportable under Sections 302, 304, 313, (40 CFR 372). Sections 311 and 312 (40 CFR 370) apply (delayed hazard).</p> <p>Hazard Categories: Immediate Hazard . No Delayed Hazard . Yes Fire Hazard . No Pressure Hazard . No Reactivity Hazard - No</p>
OSHA	<p>Toxic Substances Control Act (TSCA) - Not required to be listed on the TSCA inventory. 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.</p>
California	<p>%Glass wool fibers (inhalable and biopersistent)+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.</p>
Other States	<p>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.</p>

16. OTHER INFORMATION

Product Stewardship Program

Unifrax I LLC has established a program to provide customers with up-to-date information regarding the proper use and handling of fiber products. In addition, Unifrax has also established a program to monitor airborne fiber concentrations at customer facilities. If you would like more information about this program, please call the Product Stewardship Information Hotline at 1-800-322-2293.

Hazardous Materials Identification System (HMIS) Hazard Rating

HMIS Health	1* (* denotes potential for chronic effects)
HMIS Flammability	0
HMIS Reactivity	0
HMIS Personal Protective Equipment	X (To be determined by user)

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
PSP:	Product Stewardship Program
RCRA:	Resource Conservation and Recovery Act
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 Release
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 Substances Control Act
TWA:	Time Weighted Average
WHMIS:	Workplace Hazardous Materials Information System (Canada)

Revision Summary:

Revision Date: 12/14/2017

SDS Prepared By: UNIFRAX RISK MANAGEMENT DEPARTMENT

DISCLAIMER

The information presented herein is presented in good faith and believed to be accurate as of the effective date of this Safety Data Sheet. Employers may use this SDS to supplement other information gathered by them in their efforts to assure the health and safety of their 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 SDS. Therefore, given the summary nature of this document, Unifrax I LLC 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.