SAFETY DATA SHEET

Date Issued : 09/28/2012
Date Revised : 09/03/2015

TEMPMAT

1. PRODUCT IDENTIFICATION

DISTRIBUTOR:
GLT PRODUCTS
6810 COCHRAN ROAD
SOLON, OH 44139

EMERGENCY PHONE
CHEMTEL: 800-255-3954

INFORMATION PHONE:
800-874-1748

2. HAZARD IDENTIFICATION

CLP rule is not applicable for the following products.

Glass yams for textiles are **not significantly hazardous.**

Details regarding chemical hazards are given in Chapter 3. Toxicological aspects are described in detail in Chapter 11 . It should be highlighted that the diameter of continuous glass filament fibres are higher than 3 µm and therefore above the respirable range of 3 µm or less, thus minimising the potential for any chronic pulmonary effects associated with exposure to these fibres. The irritation caused by these fibres is a simple mechanical one, which can be controlled by good industrial hygiene practices.

Hazards identified are:

- mechanical irritation (itching)
- the formation of respirable filaments
- extremely rare possibilities of allergy.

3. COMPOSITION - INFORMATION CONSTITUANT PARTS

Glass yarns for textiles are basically sold as:

E-GLASS FIBRE
TEXTURIZED PRODUCTS
TEXTILE YARNS
TEXTILE YARN BEAMS
PLIED YARNS
GLASS FABRICS
VOLUMINIZED PRODUCTS
E-GLASS CHOPED STRANDS
GLASS FIBRE FELTS

The following material safety data sheet is valid for all above mentioned products.

Glass fibres can be considered as ARTICLES, as fibres are defined as articles in the manual of decisions for implementation of the sixth and seventh amendments to Directive 67 /548/eec on dangerous substances (EU Directives 79/831/eec and 92/32/eec) or in the USA by the American TSCA (Toxic Substances Control Act) or EPA 40 CFR 710.2 and also some other national regulations (DSL in Canada for instance).

These articles are E GLASS in the form of continuous strands and a SIZE. The CAS number of glass fibre is 65997-17-3 (corresponding to the oxides used for production).

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E GLASS is a glass with a very low alkaline content. Its composition (expressed in oxides) is within the following percentages:

SiO_2	50.8-54%
Alkaline Oxides (Na_2O, K_2O)	max 1%
CaO	21-24%
MgO	max 2%
B_20_3	6-10%
Al_20_3	13-15%
$Ti0_2$	max 0.8%
Fe_20_3	max 0.5%
F_2	0-1%

SIZE is a mixture of chemicals applied to the glass strands in a maximum quantity of 3% - more generally between 1 % and 1.6% by weight.

Most of this mixture is made up of basically non-reactive high molecular weight polymers, often natural ingredients (starches) with no reactive sites, which are not listed as substances in the 1981 European Inventory of Existing Commercial Substances (EINECS) nor in the ELINCS appendices (European List of Notified Chemical Substances) and are generally exempt from registration on the American TSCA lists.

In some cases, sizes are prepared form polymers with reactive sites or containing reactive monomers included in these lists. Most of the reactive sites are polymerised during the manufacturing process of E glass yarns. However a very small reactivity may remain which justifies the precautionary measures listed in Chapter 8 below.

A second type of ingredient (sometimes present in almost all sizes) is a member of the organo-silane family. These products account for less than 0.05% of the final weight of sized E glass. These products are included in lists of products requiring "hazardous product" labelling in a pure state (for example in Europe R23/25 toxic if swallowed or inhaled, R21 harmful in contact with the skin, R36 irritant for the eyes).

The manufacturer considers this risk as negligible as, although listed as dangerous products, the concentration is extremely low and they are polymerised during the production of E glass fibres.

Other products can be used in sizes often acting as lubricants. Usually the content is extremely low (under 0.1 % of total weight) and as a general rule such products are not on the dangerous product list or, as they have reacted, any possible risk has been reduced.

If so requested by medical authorities, the Chemical Abstract Service (CAS) reference numbers for the ingredients used for a given size or binder can be communicated but must remain for the confidential use of medical authorities.

4. FIRST AID

INHALATION: Remove from the scene of exposure to fresh air.

SKIN CONTACT: Wash copiously with lukewarm soapy water without rubbing excessively.

EYE CONTACT: Flush in running water (for at least 10 minutes) and consult a doctor if necessary.

5. FIRE FIGHTING

In case of fire, glass fibres are not flammable, are incombustible and don't support combustion.

Only the packaging (plastic film, paper, cardboard, wood) and the small amounts of size or binder are likely to bum. Combustion gases are basically carbon dioxide and water vapour. There may be small quantities of carbon monoxide and other unidentified substances, which make it necessary to use protective devices in the event of a major fire.

RECOMMENDED EXTINGUISHING MEDIA: Water or chemical powder.

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6. ACCIDENT AL SPILLAGE

PERSONAL PROTECTION: See Chapter 8.

ENVIRONMENTAL PROTECTION: In leaching tests glass fibre wastes did not emit any significant quantities of dangerous products and they can therefore be considered as **Inert Industrial Wastes**, or even **Common Industrial Wastes**, as defined by national and local regulations. All waste and scrap materials should be disposed of in accordance with applicable national, federal, state and local regulations (see paragraph 13).

CLEANING: Vacuum clean, sweep or shovel into containers normally used for glass fibre waste (selective collection).

7. HANDLING AND STORAGE

HANDLING (TECHNICAL MEASURES / PRECAUTIONS / SAFE HANDLING ADVICE): It is preferable to avoid prolonged contact with the skin: wear gloves, garments with sleeves and long leggings or protective overalls, goggles and dust masks. Glass filaments and dusts must be removed from work garments with a vacuum cleaner and not blown off with compressed air jets. Wash work garments separately from other clothes.

STORAGE**:**

TECHNICAL MEASURES: Respect the stacking procedure recommended for each type of product.

STORAGE CONDITIONS: Store away from excessive humidity to prevent damage to the product and to the packing materials, which could lead to storage safety problems.

INCOMPATIBLE MATERIAL: Not relevant.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

TECHNICAL MEASURES: Use every appropriate means (suction, modification of manufacturing methods to reduce fibre dust) to try to reduce the concentration of fibres likely to cause irritation.

TEST PARAMETERS: Test ambient atmospheres in which glass fibre is used regularly to determine levels of

- "non-respirable" and "respirable" filaments
- "non-respirable" and "respirable" dusts.

Legal requirements for respirable and non-respirable dusts and fibres vary from country to country (or do not even exist). The table below (prepared using the knowledge we currently possess) shows the limits applicable in different countries for Time-Weighted Average (TWA) exposure.

It is recommended to identify the chemical nature of the fibres found in working atmospheres correctly, in particular in insulation wools and mineral fibres like asbestos, which are sometimes present and can be confused with continuous glass strands.

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Country	Dusts	TWA (Time-Weighted Average concentration) (mg/m³ for 8 hours work)	Fibres	TWA (Time-Weighted Average concentration) (Fibres/ml for 8 hours work)
Austria	fine	6	total	0.5
Belgium	total	10	No regulation	
Denmark	respirable total	5 10	total	1
Finland	total	10	total	1
France	total	10	respirable	1
Germany	respirable	3	respirable	0.25
Great Britain	respirable total	5 10	respirable	2
The Netherlands	respirable total	2 10	total	1
Ireland	respirable	5	respirable	2
Italy	respirable total	3 10	total	1
Norway	respirable total	5 10	total	1
Portugal	total	4	total	1
Spain	total	10	total	1
Sweden	respirable total	5 10	total	1
Switzerland	total	6	respirable	0.5
USA	respirable total	5 (OSHA) *15 (OSHA)*	total	1 (ACGIH)**

* OSHA = Occupational Safety and Health Administration

** ACGIH =American Conference of Governmental Industrial Hygienists

PERSONAL PROTECTION EQUIPMENT:

RESPIRATORY PROTECTION: During occasional operations releasing high quantities of dust, wear minimum FP 1 or preferably FP2 EEC approved dust masks. Type 3M 8710 or 3M 9900 respirators approved according to American National Institute For Occupational Safety and Health (NIOSH) directives can be used, for example.

PROTECTION OF HANDS AND OTHER EXPOSED PARTS OF THE BODY:
Gloves for the hands, long-sleeved garments and long leggings to prevent irritation. People with delicate skin should apply barrier cream to exposed skin areas.

EYE PROTECTION: Safety goggles (or masks) or safety glasses.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid.

FORM: Continuous or chopped or mats of fibre made up of continuous, parallel filaments glued together.

COLOUR: White or yellowish white.

ODOUR: None.

PH: Not applicable.

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SPECIFIC TEMPERATURE AT WHICH CHANGES IN PHYSICAL STATE OCCUR:

SOFTENING POINT: Littleton point (defined as the temperature for which the viscosity of glass is $10^{7.65}$ Poises): approximately 850°C.

MELTING POINT: Not applicable. Glass does not melt, but the viscosity decreases by elevation of temperature and is 10^3 for E glass in a range of temperature between 1150°C and 1250°C (fiberizing temperature).

DECOMPOSITION TEMPERATURE: Only size products start to decompose at 200°C.

FLASH POINT: None.

EXPLOSIVE PROPERTIES: None.

DENSITY (MOLTEN MASS): 2.6 g/cm^3.

SOLUBILITY: very low solubility in water. Sizes can be partially (and even totally) dissolved in most organic solvents.

10. STABILITY AND REACTIVITY

STABILITY: Stable in normal use and storage conditions, and in normally foreseeable usage conditions.

HAZARDOUS REACTIONS: No chemical hazardous reaction is foreseeable.

HAZARDOUS DECOMPOSITION PRODUCTS: In continuous combustion conditions, in addition to water vapour and $C0_2$, small quantities of CO and NO_X may be released from the combustion of the size. Other products may be released in limited quantities, depending on combustion conditions. This is why it is recommended to use high-temperature gas masks, when fighting intense fires (see paragraph 5).

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY: Not relevant.

LOCALISED EFFECTS: POSSIBLE TEMPORARY IRRITATIONS: This irritation is of a purely mechanical and temporary nature. It disappears when exposure is ended. It can affect the skin, the eyes and the upper respiratory tracts. In Europe, mechanical irritation is not considered to be a health hazard within the terms of European directives 67 /548/EEC for hazardous products. This is confirmed by the fact that EC Directive 97 /69/EC for mineral fibres does not stipulate the need to use an Xi (irritant) label nor a classification for continuous strand fibres (which in this Directive only apply to insulation glass wools in some circumstances).

SENSITISATION: Some allergies to continuous strand glass fibres have been declared. All sizing mixtures are tested for their wet state sensitising properties when developed by JSC "Valrniera Glass Fibre" and are only adopted if they have no or a very low sensitisation level. In case of the allergy is confirmed, remove the person from the scene of the exposure.

LONG TERM TOXICITY: CARCINOGENIC RISKS. Continuous strand glass fibres are not respirable (i.e. do not penetrate the lung alveoli). This is because fibres are over 3 µm in diameter. Even after handling, the length of the finest dusts is also well over 5 µm and the length/diameter ratio is greater than 3:1. These are the values determined by the World Health Organisation (WHO) for the definition of respirable fibres.

REGULATORY SITUATION: None of the following official organisations have attributed any risks of cancer during the production and use of continuous filament glass fibres: During its congress in June 1987, World Health Organisation (WHO) through the IARC (International Agency of Research on Cancer) examined all laboratory studies using animals and epidemiological studies carried out on glass yams for textiles. The conclusion was that **glass filaments are not classified as to their carcinogenicity**. They belong to the **Group 3 of IARC**. This classification has been confirmed by the IARC Working Group during his meeting of October 2001 and in the latest issue of the IARC monographs on the evaluation of carcinogenic risks to humans, volume 81 on "Man-made vitreous fibres", published in 2002.

The International Labour Office (ILO) and the CSIP (Chemical Safety International Program) came to the same conclusions on a congress held in 1987.

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European Commission Directive 97/69/EC dated 5112/97, the 23rd amendment to Directive 67 /548/EEC which concerns classification, packing and labelling of hazardous substances did not think it necessary to include glass fibres as having carcinogenic risks.

Most European Union member nations have transposed this Directive into their national law and adopted the same conclusions:

Country	Reference of transposition documents of Directive 97 /68/EC
Austria	Chemikalienverordnung 1999
Belgium	French implementation by ,,Koninklijk Besluit" of 15/1/99 published on 24/2/99
Denmark	BEK N°11/1999.01.09 (Ministry of Environment)
Finland	Landskapforordning 23/04/98 and 24/02/98 and List of Hazardous Chemicals 16.12.98
France	Arrete ministerial du 28/08/98, Circulaire DRT 99/10 du 13/8/99
Germany	4 m adaptation of the German Gefahrstoffverordnung 1999
Great Britain	The chemicals (Hazard Information and packaging for supply) (amendment) Regulations 1998. 6/1/99
Greece	Not available
Netherlands	Wijzigingsbesluit (Stb. 217,2001)
Ireland	Statuary Instruments S.I. N°513 of 1998 European Communities (Classification, Packaging, Labelling and Notification of Dangerous Substances) Amendment N°2 Regulation 1998. Effect on December 22nd 1998.
Italy	Decreto ministeriale del 01109/98, Gazzetta Ufficiale-Serie generaledel 19/ 11 /98 n271 pag. 16, decretto del 2 fe 2000, circolare n°4 del 15/03/1999
Luxembourg	Reglement Grand Ducal du 31/10/98
Portugal	Not available
Spain	Bulletin Oficial del Estada (11/09/98)
Sweden	KIFS 1998:7

OSHA (Occupational Safety and Health Administration) and NTP (U.S. National Toxicology Program), official American organisations, have not listed glass yams for textiles as hazardous substances and the ACGIH (American Conference of Governmental Industrial Hygienists) has classified them as A4 (not classified as carcinogenic for Man). They are not concerned by the Canadian Controlled Products regulations (CPR).

No new studies have led the organisations to revise their position on this subject.

Most laws and studies concerning respirable fibres do not apply to continuous filaments glass yams for textiles. For example,

- The concentration of respirable fibres on the atmosphere (1.5 fibres/cm3) fixed by French circular 95/04 dated 12/0111995 (in addition to that dated 19/0711982) from the French Ministry for Work does not apply to glass yarns.
- Cancer risk index KI defined in German TRGS 905 does not apply to nonrespirable continuous filament glass fibres.

EPIDEMIOLOGICAL AND LABORATORY STUDIES:

No epidemiological and laboratory studies carried out up until now demonstrate in a scientifically significant way any risk of cancer related to reinforcement fibres.

Several recent epidemiological studies (Chiazze 1997, Bo ff eta 1997) confirmed the absence of excessive mortality due to cancer in people working in glass fibre manufacturing facilities vs. control populations.

A recent study published in 2000 by the IOM (Institute of Occupational Medicine in Edinburgh) addressed the inhalation of E-glass microfibres by animals at concentrations al least 1000 times higher than those encountered when using glass fibres demonstrated carcinogenic risk. These microfibres are not part of the

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product range produced and sold by JSC "Valmiera Glass Fibre" and these findings are not likely to charge current opinions for the glass yams described in this MSDS.

HANDLING GLASS FIBRES: When glass fibres are chopped, milled or sanded they are cut perpendicular to strand length and no smaller diameters filaments are generated. Conversely, significant quantities of dust can be generated, which is why it is recommended to use personal protection. In dusts, also present in some products (chopped strands, milled fibres), some studies have shown very low quantities of particles with fibrous aspects (l/d>3), short (but nevertheless longer than 5 µm) and with an apparent diameter of under 3 µm. Quantities measured in work atmospheres are 50 to 100 times lower than all the limits fixed for respirable fibres, but when there is a high risk of dust generation it is strongly recommended to wear masks.

MUTAGENIC RISKS, TERATOGENIC RISKS, RISKS FOR REPRODUCTION: continuous strand glass yams have no known risks.

12. ECOTOXICOLOGICAL INFORMATION

E glass is not biodegradable. Sizes or binders are organic materials slowly and only partial dissolved by natural agents like water. As the concentration of the ingredients in the mixture and ingredient solubility are low and as they have not been classified as hazardous, glass yams are considered to have no adverse eco-toxicological effects.

Glass fibres and sizing products **were not listed as products** likely to destroy the **ozone layer** by the 1987 Montreal Protocol (Class 1 or Class 2). These lists are included in EC Regulation n° 3093/94 and in section VI of amendments to the "Clean Air Act" by the American Environmental Agency (EPA).

Glass fibre sizes do not contain PCB (Polychlorinated biphenyl) or/and other polyaromatic products of the same type.

13. WASTE DISPOSAL

Depending on local regulations, glass fibre wastes can either be considered as **inert waste** or as **common industrial waste**. As such they can be buried in landfills approved for these categories.

Glass fibres waste cannot be destroyed by incineration and can damage incinerators by the formation of a vitrified mass.

Clean cardboard, wood, plastic (film or bags) and packaging can be eliminated in units specific to these products (i.e. for recycling or use as fuels) .

14. TRANSPORT

INTERNATIONAL REGULATIONS: Glass yams are not considered as hazardous goods by transport regulations. They are part of one of the hazardous classes listed in international regulations.

They do not need special procedures under any regulations. For international transport in Europe by land (new restructured version of ADR applicable as from July 1st 2001 , RID, ADNR), sea (OMI) or air (OAC/IATA), or to the USA (DOT) or Canada (TDG), they are not shown as a risk category nor qualified by a UNO number or a packing group.

15. REGULATORY INFORMATION

Continuous filaments glass yams do not require hazardous product labelling (see Chapter 11).

General hygiene and work safety regulations apply (see Chapter 8).

Continuous filament glass yams are articles and for this reason they have not to be listed in most of the countries, for instance in the list EINECS in Europe, ELIN CS, TSCA for the USA, DSL and NDSL for Canada, ...

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16. OTHER INFORMATION

FOOD ENVIRONMENTS: Appendix III of European Directive 90/128/CEE and its most recent amendment 96/11/CE dated 5/03/96 define the compatibility of pure glass fibres with food environments as additives to plastics. However the fact that sizing products should be shown on the current list of European Commission approved products, the BGVV LII list in Germany of the Food and Drugs Administration lists (FDA) in the USA means that a case by case study must be made if a JSC "Valmiera Glass Fibre" range product is used to reinforce a plastic material in contact with food. Consult the JSC "Valmiera Glass Fibre" Service for further information.

CONTACT WITH POTABLE WATER: As differ form country to country, every question must be examined individually.

This Material Safety Data Sheet is in addition to the Product Specification file and other technical documents issued by GLT PRODUCTD, but does not replace them.

The information given by this document is based on the best knowledge at the shown. It is given in good faith. Furthermore, user attention is drawn to the possible risks run when the product is used for any purpose other than the one for which it was designed.

This MSDS does not exempt users from knowing and applying the rules regulating their activities. Users assume full responsibility for applying the appropriate safety measures when the product is used.