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TOGETHER FOR SUCCESS

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شيح شعيب ٤، رقم القطعة ٥٣٣-٢٩٧، ص.ب.: ١٧١٣٤
مجمّع دبي الصناعي ، دبي - الامارات العربية المتحدة
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MATERIAL SAFETY DATA SHEET

1- PRODUCT IDENTIFICATION:

"GLASS SURFACE TISSUE
FIBERGLASS CHOPPED STRAND MAT
WOVEN ROVING
COMBINATION MAT"

2 - COMPOSITION – INFORMATION CONSTITUANT PARTS

Glass mats produced with continuous glass filaments, either by dry process (C glass) or by wet process (E or AR glass), are basically sold as:
ROLLS
STRIPS
The product packing specifies these general names followed by a code number.

This Material Safety Data Sheet is valid for all these products.
Glass Fibers (basic products of the glass mats) can be considered as ARTICLES, as fibersare 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 mixtures of E GLASS in the form of continuous strands and a SIZE with, in addition, a BINDER in the case of mats.

The CAS number of C or E is 65997-17-3 (corresponding to the oxides used for production).

E GLASS is a glass with a very low alkaline content. Its composition (expressed in oxides) is within the following percentages:
SiO2 52-62%
Alkaline Oxides (Na2O, K2O) < 2%
Alkaline earth oxides (CaO, MgO) 16-30%
B2O3 0-10%
Al2O3 11-16%
TiO2 0-3%
Fe2O3 0-1%
HF 0-2%

C GLASS is a glass with very high alkaline content and low aluminium oxide content. Its composition (expressed in oxides) is within the following percentages:
SiO2 62-67%
Alkaline Oxides (Na2O, K2O) 15-17%
Alkaline earth oxides (CaO, MgO) 10-12%
B2O3 3-6%
Al2O3 1-4%
Fe2O3 0-1%
P2O5 0-1%

SIZE is a mixture of chemicals applied to the glass strands in a maximum quantity of 0.5% - more generally less than 0.2%. Most of this mixture is composed of basically non-reactive high molecular weight polymers 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 in the American TCSA lists.

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

A second type of ingredient 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.

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 glass Fibers.

Other products can be used in sizes. 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 lists or, as they have reacted, any possible risk has been reduced.

The **BINDERS** used to bond the glass filaments together are generally water-based phenol formaldehyde, melamine-formaldehyde or urea-formaldehyde resins; polyvinyl, acrylic or other latex emulsions; or blends of these binders. They are polymerised by thermal treatment.

Their content in the glass mat is between 2 and 30% by weight. When cross- linked for binding the filaments together, they are high molecular weight polymers and as such are not listed as dangerous substances.

Some of the monomers used for the production of these polymers may be listed in the dangerous products of the European Directive 67/548 and subsequent amendments, but remain only as traces in the end products.

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.

3 - HAZARD IDENTIFICATION

Glass mat products made with E continuous filament glass, or considered as continuous filaments for C glass strands produced by dry process **are not significantly hazardous.**

Details about chemical hazards are given in paragraph 2.
Toxicological aspects are developed in detail in chapter 11.
The essential points to remember are that glass filaments are not “respirable” as their nominal diameters are over 9 µm, far over the diameter of 3µm defined by the World Health Organisation for “respirable” Fibers, and that they have been shown not to cause lung cancer

Hazards identified are:

- mechanical irritation (itching)
- dusts particles which can be inhaled; i.e. able to be breathed in the upper respiratory tract – as differentiated from respirable products which can penetrate the far lung extremities.
- Allergies in rare instances

4 - FIRST AID

INHALATION: remove from the scene of exposure to fresh air

SKIN CONTACT: wash copiously with lukewarm soapy water without excessive

Rubbing EYE CONTACT: flush in running water (for at least 10 minutes), and consult a doctor as necessary

5 - FIRE FIGHTING

In case of fire, glass Fibers are not flammable, are incombustible and don't support combustion. Only the packaging (plastic film, paper, cardboard, wood) is likely to burn. Binders, in spite of their organic nature, do not burn readily; but can support combustion. Combustion gases are basically carbon dioxide and water vapour. There may be small quantities of carbon monoxide and other unknown substances that make it necessary to use protective devices in the event of a major fire.

RECOMMENDED EXTINGUISHING MEDIA: water or chemical powder

6 - ACCIDENTAL SPILLAGE

PERSONAL PROTECTION: See Chapter 8.
ENVIRONMENTAL PROTECTION, glass Fiber 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 material 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 Fiber waste
(Selective collection).

7 - HANDLING & STORAGE

HANDLING (Technical measures / Precautions / Safe handling advice):

It is preferable to avoid prolonged contact with the skin: wear gloves, garments with long 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 either 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 Fiber dust, etc…) to try to reduce the concentration of Fibers likely to cause irritation.

TEST PARAMETERS

Test ambient atmospheres in which glass Fiber 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 Fibers 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 Fibers found in working atmospheres correctly: in particular insulation wools and mineral Fibers like asbestos which are sometimes present and can be confused with C and E continuous glass strands.

Country	Dusts	TWA (Time Weighted Average Concentration) (mg/cu m 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	1
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	respirable 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 FP1 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: use approved safety goggles, masks or safety glasses as required.

9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
FORM: glass mat rolls or strips
COLOUR: white or yellowish white, depending on the binders
ODOUR: none
pH: not applicable
SPECIFIC TEMPERATURE AT WHICH CHANGES IN PHYSICAL STATE OCCUR:
Softening point: Littleton point (defined as the temperature for which the viscosity of glass is 107.65 Poises): approximately 850°C for the E glass and 690°C for C glass.
Melting point: Not applicable. Glass does not melt, but the viscosity decreases by elevation of temperature and is 103 for E glass in a temperature between 1150 and 1250°C, for C glass in a temperature around 1060°C.
FLASH POINT: None
EXPLOSIVE PROPERTIES: None
DENSITY (molten glass): Depending on glass strands and binder rates. The density of glass is for E: 2,6g/cm3 and for glass C: 2.53g/ cm3.
SOLUBILITY: Very low solubility in water. Size and binders can be partially (and even totally) dissolved in most organic solvents.

10 - STABILITY AND REACTIVITY

STABILITY
If the normal temperature range of use is high, the binders used for glass mat can be slightly degraded by heat in normal high temperature of use. Evolving gases may irritate the eyes, throat or nose. Toxic risks are low. To improve working conditions, and particularly if exposure to these gases is long, it is recommended to install smoke evacuation devices near the heating points or to wear masks.

HAZARDOUS REACTIONS
Glass mat products are stable and never generate hazardous chemical reactions.
HAZARDOUS DECOMPOSITION PRODUCTS
In continuous combustion conditions, in addition to water vapour and CO2, small
quantities of carbon monoxide or other products may be released from the combustion of
the size and/or binder. Other products may be released in limited quantities depending on combustion conditions. This is why it is recommended to use high-performance 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, eyes and 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 Fibers does not stipulate the need to use a Xi (irritant) label nor a classification for continuous strand glass Fibers (which in this Directive only applies to insulation glass wools in some circumstances).

SENSITIZATION: some **allergies** to continuous strand glass Fibers have been declared. All sizing mixtures are tested for their wet state sensitising properties when developed by Changzhou Changhai and are only adopted if they have no or a very low sensitization level. In case of a confirmed allergy, remove the person from the scene of exposure.
LONG TERM TOXICITY: CARCINOGENIC RISKS

Continuous strand glass Fibers are not respirable (i.e., do not penetrate the lung alveoli).

This is because Fiber is over 3µm in diameter (and, mostly, over 9µm). Even after handling, the length of the finest dusts is also well over 5µm 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 Fibers.

Regulatory situation:
None of the following official organizations have attributed any risks of cancer during the production and use of continuous filament glass Fibers:
During its congress in June 1987, World Health Organization (WHO) through the IARC (International Agency of Research on Cancer) examined all laboratory studies using animals and epidemiological studies carried out on continuous strand glass reinforcement Fibers. 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 human's volume 81 on Man-made vitreous Fibers, published in 2002.

The International Labour Office (ILO) and the CSIP (Chemical Safety International Program) came to the same conclusions in a congress held in 1987. European Commission Directive 97/69/EC dated 5/12/97, 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 Fibers as having carcinogenic risk. 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 97/69/EC
Austria	Chemikalienverordnung 1999
Belgium	French implementation by << Koninklijk Beshit >> 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
Germany	4th adaptation of German Gefahrstoffverirdnung 1999
Great Britain	The chemicals (Hazard Information and packaging for supply) (amendment) Regulations 1998. 6/1/99
Greece	Not available
The 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 22 December 1998.
Italy	Decreto ministeriale del 01/09/98, Gazzetta Ufficiale-Serie generale-del 19/11/98 n271 pag. 16, decretto del 2 feb 1999, circolare n°4 del 15/03/1999
Luxembourg	Reglement Grand Ducal du 31/10/98
Portugal	Non disponible
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 organizations, have not listed continuous strand glass Fibers 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 organizations to revise their position on this subject.
Most laws and studies concerning respirable Fibers do not apply to continuous filaments reinforcement Fibers.

For example:
□□The concentration of respirable Fibers in the atmosphere (1.5 Fibers / cm3) fixed by French circular 95/04 dated 12/01/1995 (in addition to that dated 19/07/1982) from the French Ministry for Work does not apply to glass reinforcement Fibers.

□□Cancer risk index KI defined in German TRGS 905 does not apply to non-respirable
continuous filament glass Fibers.

Epidemiological and laboratory studies
Epidemiological and laboratory studies carried out to date do not demonstrate in a scientifically significant way any risk of cancer related to reinforcement Fibers. Several recent epidemiological studies (Chiazze 1997, Boffeta 1997) confirmed the absence of excessive mortality rates due to cancer in people working in glass Fiber 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 microfibers (diameter very lower than 3µm) by animals at concentrations at least 1000 times higher than those normally encountered by humans when using glass Fibers under work conditions, did demonstrate a carcinogenic risk to these animals.

These microfibers are not part of the product range produced and sold by Changzhou Changhai and these findings are not likely to change current opinions for the glass Fibers described in this MSDS.

Handling glass Fibers
When glass Fibers 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, crushed Fibers) some studies have shown very low quantities of particles with short fibrous aspects (l/d>3), but nevertheless longer than 5µm, and with an apparent diameter of under 3µm. Quantities of this dust measured in work atmospheres are 50 to 100 times lower than all the limits fixed for respirable Fibers. However, when there is a high risk of dust generation, wearing of masks is strongly recommended.

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

12 - ECOTOXICOLOGICAL INFORMATION

C and E glass are not biodegradable.
As the concentration of the ingredients in the size mixture and ingredient solubility are low, glass reinforcement Fibers are considered to have no adverse eco-toxicological effects.
Glass Fibers sizing products, polymers and additives are not likely to destroy the **ozone layer** and are not listed in 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 strands, sizing polymers and binders do **not contain PCB** (Polychlorinated biphenyl) or and other polyaromatic products of the same type.

13 – WASTE DISPOSAL

Depending on local regulations, glass mat wastes can either be considered as **inert waste** or as **common industrial waste.**

Glass Fibers 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 mat products are not considered as hazardous goods by transport regulations.
They are not 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 an UNO number or a packing group.

15 – REGULATORY INFORMATION

Glass mat products do not require hazardous product labelling (see Chapter 11).
General hygiene and work safety regulations apply (see Chapter 8).
Glass mat products are articles and for this reason they have not to be listed as such in substance lists in most of the countries, for instance in the list EINECS in Europe, ELINCS, TSCA for the USA, DSL and NDSL for Canada, …

16 - OTHER INFORMATION

When exposed to moisture of the air in its packaging for a long period, some odour may be present on opening of the packaging. This odour (of fish) comes from a small degradation of nitrous components and is due to trace amounts and does not generate any risk. CONTACT WITH POTABLE WATER: As differ from country to country, every question must be examined individually with the relevant Changzhou Changhai Services.

OTHER INFORMATION

This Material Safety Data Sheet is in addition to the Product Specification file and other technical documents issued by Changzhou Changhai, but does not replace them. The information given by this document is based on the best knowledge at the date shown. It is given in good faith. Furthermore, users' 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.