



MATERIAL SAFETY DATA SHEET

In compliance with EEC Directives 93/112/CE dated 12/10/93 and 2001/58/CE dated 07/27/2001
updating Directive 91/155 dated 03/05/1991
And in compliance with ISO standards 11014-1 dated 03/15/94 and ANSI Z400.1 dated 1998

1 COMPANY – PRODUCT IDENTIFICATION

MANUFACTURER:

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Production plants:

PRODUCT IDENTIFICATION:

“GLASS WOVEN FABRICS”

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2 - COMPOSITION – INFORMATION CONSTITUANT PARTS

Glass woven fabrics produced with continuous glass filaments, either yarns or strands coated with a surface finish. They are basically sold as rolls of :

Fabrics RECO
Mesh Fabrics
Glass wall covering
Glass fibre scrim

Relius Benelux product packing specifies these general names followed by a code number.

This Material Safety Data Sheet is valid for all these products.

Glass woven fabrics products are not substances but preparations within the meaning of EEC Directive 67/548 dated June 27th, 1967, corresponding to a mixture of E Glass, a SIZE, and a finish.

It is exactly the same for the American TSCA (Toxic Substances Control Act) legislation in which Glass woven products are considered as items. The CAS number of E glass is 65997-17-3 (corresponding to the oxides used for production). Their labelling meets the European regulation (Directive 99/45/EC) on preparations.

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

SiO ₂	52-62%
Alkaline Oxides (Na ₂ O, K ₂ O)	< 2%
Alkaline earth oxides (CaO, MgO)	16-30%
B ₂ O ₃	0-10%
Al ₂ O ₃	11-16%
TiO ₂	0- 3%
Fe ₂ O ₃	0- 1%
HF	0- 2%

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SIZE is a mixture of chemicals applied to the glass strands in a maximum quantity of 2.5% - more generally less than 1.5%.

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 the American TSCA 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 or AR Cem-FIL[®] 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 glass fibres.

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 **SURFACE FINISH PRODUCTS** used to protect, discolour or maintain the glass fibres together are generally water based products (emulsion of polymers, lubricants, plasticizers, colouring agents). For example polyvinyl acetate, styrene butadiene latex, acrylate copolymers, starch based products, or blends of these binders are currently used. They are polymerised by thermal treatment. Their content on the glass woven product is between 11 and 30% by weight. When cross-linked, 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.

Some of the chemicals used for additional properties are more reactive, but we never use very dangerous products (no carcinogenic, mutagenic or dangerous for reproduction) and if small amounts of irritating products are used, they are blended and in a very low amount.

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

3 - HAZARD IDENTIFICATION

Glass woven products made with E continuous filament glass **are not significantly hazardous**.

Details about chemical hazards are given in paragraph 2. Toxicological aspects are developed in detail in chapter 11. The essential point 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" fibres, and that they have been shown not to cause lung cancer.

Hazards identified are:

10. 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.
11. Allergies in rare instances

4 - FIRST AID

INHALATION: remove from the scene of exposure to fresh air

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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 fibres are not flammable, are incombustible and don't support combustion. The packaging (plastic film, paper, cardboard, wood) is likely to burn. The binders, from their organic nature, can also burn. 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 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 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 fibre 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 fibre dust, etc...) 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, fibres and powdered resins 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 for dust and fibres.

It is recommended to identify the chemical nature of the fibres found in working atmospheres correctly: in particular insulation wools and mineral fibres like asbestos which are sometimes present and can be confused with C, E and AR Cem-FIL® 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	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 No regulation	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: rolls or strips
COLOUR: white, or colored as requested by the customers needs.
ODOUR: none
pH: not applicable

SPECIFIC TEMPERATURE AT WHICH CHANGES IN PHYSICAL STATE OCCUR:

SOFTENING POINT (Littleton point) : E glass approximately 850°C – melting point range 1200-1250°C.
DECOMPOSITION TEMPERATURE: Polymers finishes start to decompose at 230°C to 250°C
FLASH POINT: None
EXPLOSIVE PROPERTIES: None
DENSITY (molten glass): Depending on glass strands and finishes rates (density of glass : 2.6 g/cm³ – density of polymer : 1.0 to 1.2g/cm³).
SOLUBILITY: Very low solubility in water. Size and finishes 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 finishes used for glass woven products 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 woven 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 finishes. 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 fibres does not stipulate the need to use an Xi (irritant) label nor a classification for continuous strand glass fibres (which in this Directive only applies to insulation glass wools in some circumstances).

SENSITIZATION: some **allergies** to continuous strand glass fibres have been declared. In case of a confirmed allergy, remove the person from the scene of exposure.

LONG TERM TOXICITY: **CARCINOGENIC RISKS**

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

This is because fibre 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 fibres.

Regulatory situation:

None of the following official organizations have attributed any risk of cancer during the production and use of continuous filament glass fibres:

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 fibres. 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.

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 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 97/69/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	Arrêté ministériel du 28/08/98, Circulaire DRT 99/10 du 13/8/99
Germany	4th 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
The Netherlands	Wijzigingsbesluit (Stb. 217,2001)
Ireland	Statutory 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, decreto del 2 feb 1999 , circolare n°4 del 15/03/1999
Luxembourg	Règlement 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 fibres 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 fibres do not apply to continuous filaments reinforcement fibres.

For example,

- The concentration of respirable fibres in the atmosphere (1.5 fibres / 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 fibres.
- Cancer risk index KI defined in German TRGS 905 does not apply to non-respirable continuous filament glass fibres.

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 fibres.

Several recent epidemiological studies (Chiazze 1997, Boffeta 1997) confirmed the absence of excessive mortality rates 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 microfibrils (diameter very lower than 3µm) by animals at concentrations at least 1000 times higher than those normally encountered by humans when using glass fibres under work conditions, did demonstrate a carcinogenic risk to these animals. These microfibrils are not part of the product range produced and sold by RELIUS Benelux and these findings are not likely to change current opinions for the glass fibres 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 use of personal protection equipment is recommended when handling glass fibres. In dusts also present in some products (chopped strands, crushed fibres) some



studies have shown very low quantities of particles with short fibrous aspects ($l/d > 3$), but nevertheless longer than $5\mu\text{m}$, and with an apparent diameter of under $3\mu\text{m}$. Quantities of this dust measured in work atmospheres are 50 to 100 times lower than all the limits fixed for respirable fibres. However when there is a high risk of dust generation, wearing of masks is strongly recommended. It is not a risk to be considered for woven glass products.

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

12 - ECOTOXICOLOGICAL INFORMATION

E glass is not biodegradable.

As the concentration of the ingredients in the size mixture or finish products and as ingredient solubility are low, glass woven products are considered to have no adverse eco-toxicological effects.

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

13 – WASTE DISPOSAL

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

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 woven 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 1st of July 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

Glass woven products do not require hazardous product labelling (see Chapter 11).

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

Glass woven products are preparations and for this reason are not listed as such in substance lists in several countries (EINECS in Europe, ELINCS, TSCA for the USA, DSL and NDSL for Canada, MITI for Japan, PICS for the Philippines, KECI for Korea, AICS for Australia). When importing to these countries, it may be necessary to list the ingredients of the preparation. RELIUS Benelux asks its raw material suppliers to list their products in most countries when local regulations require so.



16 - OTHER INFORMATION

When exposed to moisture of the air in its packaging for a long period, some odor may be present on opening of the packaging. This odor may come from a small degradation of some polymeric 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 RELIUS Benelux Services.

This Material Safety Data Sheet is in addition to the Product Specification file and other technical documents issued by RELIUS BENELUX 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.

For all additional information, users should contact their local RELIUS Benelux agent.