DATA SHEET
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E-Glass Fibre

Summary

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Overview

E-glass fibre has been in use since 1930, in large-scale industrial applications, as a high-temperature insulator for electrical conductors. E-glass fibres are the most widespread in use, whether in the textile industry or for composite materials, and are present in 90 % of reinforcements. This high-quality fibre is distinguished by its resistance to high temperatures and its excellent electrical insulating properties. This fibre is rot-proof, resistant to the most common chemical agents and dimensionally stable, even in the event of substantial variations in humidity and temperature.

E-glass filaments of diameter exceeding 9 µm can cause skin irritations. For this reason, E-glass fibre cords supplied are produced from textured and twisted strands of diameter ranging from 6 – 9 µm.

These e-glass products complement Newtex's product range.

Manufacturing

E-glass fiber's manufacturing follows several steps. First, boron oxide is added to silica, lime, alumina and magnesia. Alkaline oxides are excluded from this mix. This composition is then ignited and at around 800 °C, the molten paste begins to take on a viscous consistency, then liquid: it vitrifies. At 1,500 °C, the last bubbles and impurities disappear from the glass. When refined, the molten mass is perfectly transparent when it leaves the furnace and the mass is passed through dies (platinum alloy plates pierced with hundreds of holes) to produce a glass thread. This thread is then sized, wound and dried.

Other Types of Glass

Other types of glass have very specific application. They are used for their resistance to corrosion or to alkaline substances, and for their electrical or mechanical properties.

Applications

- Electrical insulation
- Thermal insulation
- Various reinforcement
- Composite products
- Transport
- Buildings
- Aeronautics
- Sealing for oven doors
- Sealing for piping
- Protection of cables, sheaths and pipes
- Insulation
- Induction coil protection

General Characteristics

Mechanical and Physical Properties

E-glass fibre products are particularly resistant to abrasion and vibration and have excellent flexibility. The glass thread has a higher specific resistance (tensile strength/volumetric mass) than that of steel. This feature makes it possible to develop glass threads that reinforce high performance composites.

Thermal Properties

E-glass fibre has low thermal conductivity. For felt, for example, conductivity is 0.03 $W.m^{-1}.K^{-1}$. The fibre can withstand temperatures of over 600 °C and is non-combustible.

Chemical Properties

Fibrous E-glass products are resistant to oils, solvents and most chemical agents. They are also rot-proof.

Dimensional Stability

Glass thread is insensitive to variations in temperature and humidity and has a low expansion coefficient.

Electrical properties

Its excellent electrical insulation properties, even at low thickness.

Benefits

- Inorganic
- Good resistance to abrasion and vibrations
- Incombustible
- Rot-resistant
- Resistant to the main chemical agents
- Excellent dielectric strength
- Excellent dimensional stability
- Compatible with organic dies

Comparative Table

Property	Unit	E-Glass	Pure Silica	Kevlar®
Density	g/cm^3	2.6	2.2	1.44
Poisson Coefficient	-	0.25	0.16	0.36
Breaking Strength	MPa	2,400	3,600	3,000
Elongation	%	3.5	7.7	2.4
Linear Expansion Coefficient	$X10^{-6}.K^{-1}$	9	0.54	- 2
Operating Temperature	°C	550	1,000	300
Peak Temperature	°C	700	1,200	450
Specific Heat at 20 °C	$J.kg^{-1}.K^{-1}$	720	750	1,420
Thermal Conductivity at 20 °C	$W.m^{-1}.K^{-1}$	0.8	1.38	0.4

Product range

Threads

The flexibility of E-glass fibre permits the design of high-strength sewing yarns for the production of thermal protection systems or thermal, dielectric or chemical insulation solutions.

Property	Unit	E-glass Threads		
Coating		207-4801	207-4802	207-4803
Item N°		with PTFE		
Title	tex	280	240	140
Title (with coating)	tex	340	260	170
Diameter	mm	0.5	0.4	0.3
Reel Length	m	1,250	1,500	2,900
Real / Weight	g	500	500	500
Tensile Strength	N	> 130	> 100	> 65
Operating Temperature	°C	550	550	550
Peak Temperature	°C	700	700	700

Packings

Packings consist of an outer sheath made of 9 µm E-glass fibre and a ceramic fibre core, suitable for high temperature applications up to 700 °C. They have excellent mechanical, thermal and dielectric properties. They are available in round or square sections. Packings are mainly used as seals for the insulation of industrial furnaces and in the metallurgical industry.

E-Glass Fibre

Property	Unit	E-Glass Packings
Item N°		207-4401
Construction		Outter sleeve : 9 µm E-glass fibre Core : 100 % biosoluble fibre
Diameter	mm	12 to 80
Section		round
Linear Density	g/m	115 to 2,000
Packaging	m	10 to 50
Operating Temperature	°C	550
Peak Temperature	°C	700

Other dimensions produced on request.

Felts

Needled fibreglass felts are made of thermally stable, cut E-glass fibre. This felt has excellent mechanical, chemical and dielectric properties. In addition, it can withstand a continuous temperature of 550 °C, and can be reinforced with a layer of aluminium to withstand radiant heat up to 1,650 °C. They are mainly used in the naval and automotive industries for thermal and acoustic insulation.

Property	Unit	E-Glass Fibre Felts
Item N°		207-4701
Density	kg/m^3	100 to 160
Thickness	mm	3 to 25
Area Density	g/m^2	300 – 4,000
Width	mm	1,000 to 1,500
Fibre Diameter	µm	Approx. 6-9
Thermal Conductivity	$W.m^{-1}.K^{-1}$	0.03
Electrical Rigidity	kV/mm	60 to 100
Operating Temperature	°C	550
Peak Temperature	°C	700

Other dimensions available on request.

Twisted Ropes

E-glass fibre twisted ropes are produced from textured and twisted strands of diameter ranging from 6 to 9 µm. These products are soft, and extremely flexible. These are employed in applications involving continuous exposure to temperatures up to 550 °C. Versions sheathed in stainless steel or glass fibre are available, to permit the compaction of the rope and increase its abrasion-resistance.

E-glass fibre ropes are available in diameters ranging from 3 to 50 mm.

Property	Unit	E-Glass Twisted Ropes													
Item N°		207-4601													
Section		round													
Diameter	mm	3	4	5	6	8	10	12	15	20	25	30	35	40	50
Reel	kg	5	5	5	5	5	5	5	5	5	5	5	15	15	20
Operating Temperature	°C	550													
Peak Temperature	°C	700													

Other dimensions are only produced on request.

Braided Ropes

Produced in round or square sections, E-glass fibre braided ropes are manufactured from textured strands of diameter ranging from 6 to 9 µm. These are employed in applications involving continuous exposure to temperatures up to 550 °C.

Various treated versions are available: silicone-, rubber- or PTFE-coated, graphite-impregnated, aramid-combined or stainless-steel sheathed. This permits the improvement of the mechanical properties of braided ropes, the prevention of contamination by stray fibres or the improvement of leak-tightness.

Braided ropes are available in standard diameters ranging from 4 to 60 mm.

Property	Unit	E-Glass Braided Ropes														
Item N°		round section: 207-4301														
Item N°		square section: 207-4302														
Diameter	mm	4	6	8	10	12	14	16	18	20	22	28	30	40	50	60
Reel Length	kg	5	10	10	10	15	15	20	20	25	25	25	25	30	30	30
Operating Temperature	°C	550														
Peak Temperature	°C	700														

Other dimensions are available on request.

Any fraying of cut sleeving is prevented by two knitted versions: white for applications up to 550 °C, and black for applications up to 700 °C, under continuous exposure to these temperatures. The knitted manufacturing process also improves the elasticity of sleeving, and restricts the occurrence of stray fibres. Round- or square-section braided ropes may be stainless steel-reinforced, graphite-impregnated or sleeved in stainless steel or glass fibre for the improvement of resilience, mechanical properties and abrasion-resistance, or the prevention of contamination by stray fibres. These product references are available on request.

Sleeves

E-glass fibre sleeves are highly flexible, thereby facilitating the insertion of cables or pipes to be insulated. These sleeves are used for the thermal protection and electrical insulation of cables and pipes.

Silicone-coated, lacquered or stainless steel-clad versions are available on request, for the improvement of mechanical and dielectric properties and the prevention of the loss of stray fibres.

Sleeves are available in standard diameters ranging from 12 to 60 mm, in braided or knitted versions.

Property	Unit	E-Glass Sleeves								
Item N°.		207-4501								
Construction		braided								
Diameter	mm	12	15	20	25	30	35	40	50	60
Roll Length	m	100	50	50	50	50	50	50	50	25
Operating Temperature	°C	550								
Peak Temperature	°C	700								

Other dimension are available on request.

Physical variables included in this documentation are provided by way of indication only and do not, under any circumstances, constitute a contractual undertaking. Please contact our technical service if you require any additional information.