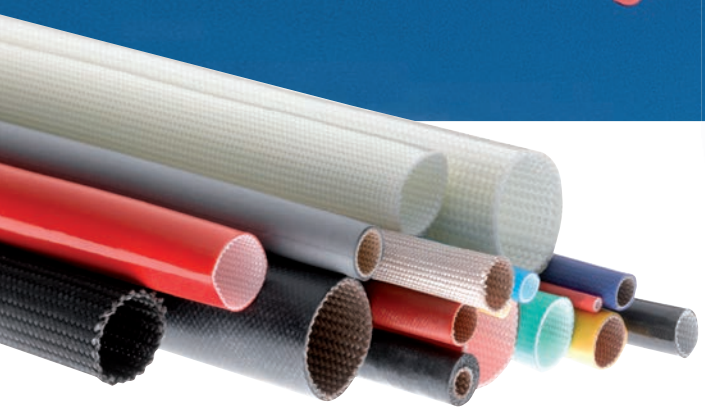
ENERGY TECHNOLOGY

High-performing Insulation Systems for Generators and Transformers



Flexibility, Opportunities, Innovations

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MATERIALS FOR THE ENERGY INDUSTRY

The insulation materials used are characterized by their high dielectric strength, chemical and temperature resistance. They correspond, among others, to standards UL 1441 and DIN IEC 60684. Selected materials with their typical characteristics are listed below. Special types are available upon request.

Product	Carrier material, coating material	Dimensions *[mm]*	Operating temperature *[°C]*	Chemical resistance	Mechanical properties
Peatex	Polyester Acrylic resin	⌀ (inside) 3.0 – 20 wall thickness 0.4 – 0.80	-20 up to +155 temporarily +200	very good resistance to fuels and lubricants	low wearing under mechanical and dynamic load
Acrytex	E-glass Acrylic resin	⌀ (inside) 0.5 – 40 wall thickness 0.3 – 1.20	-40 up to +155 temporarily +450	very good resistance to fuels and lubricants	good abrasion resistance, good buckling resistance
Varnitex	E-glass PU resin	⌀ (inside) 0.5 – 40 wall thickness 0.4 – 1.20	-40 up to +155 temporarily +225	excellent impregnating resin compatibility, very good resistance to fuels and lubricants	high abrasion resistance, kink and bend resistant
Polytex HE	E-glass Acrylate-PU resin	⌀ (inside) 0.5 – 30 wall thickness 0.3 – 1.50	-20 up to +155 temporarily +225	good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol	good tear resistance, high buckling resistance and flexural strength
Polytex HE DUO	E-glass Acrylate-PU resin	⌀ (inside) 3.0 – 20 wall thickness 1.0 – 3.0	-20 up to +155 temporarily +225	good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol	good tear resistance, high buckling resistance and flexural strength
Isotex LSI	E-glass Liquid silicone	⌀ (inside) 0.5 – 10 wall thickness 0.4 – 0.8	-40 up to +180 temporarily +250	good resistance to automatic gearbox oil and rolling-bearing grease	very good cutting and abrasion resistance
Ultraflex	E-glass Silicone rubber	⌀ (inside) 3.0 – 60 wall thickness 0.6 – 1.50	-40 up to +210 temporarily +300	excellent resistance to water, water-glycol mixture and salt spray, resistant to fuels and lubricants in temporary exposure	good abrasion resistance, good buckling resistance and flexural strength
Thermoflex RI	E-glass Silicone resin	⌀ (inside) 5.0 – 30 wall thickness 0.6 – 1.50	-40 up to +250 temporarily +350	good resistance to water and salt spray as well as fuels and lubricants in temp. contact	good abrasion resistance, good buckling resistance and flexural strength
Varnitex Genius SE	E-glass Silicone Acrylate-PU resin	⌀ (inside) 5.0 – 30 wall thickness 1.0 – 3.0	-40 up to +180 temporarily +225	good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol	high abrasion resistance
Polyester cord	PES with EP/acrylic-PU resin	⌀ (outer) 2 – 10	-20 up to +155 temporarily +200	good compatibility with solvent-free impregnating resins	high tear resistance, excellent abrasion characteristics
Fibreglass cords	E-glass also impregnated with EP resin or accelerator	⌀ (outer) 4 – 40	-60 up to +300 temporarily +500	impregnating varnishes, acids, caustic solutions, resin systems, etc.	high tear resistance
Glass fibre tape	E-glass also impregnated with EP resin or accelerator	width 6 – 40 thickness 0.08 – 0.20	-60 up to +300 temporarily +500	compatible with all generally available impregnating resins and impregnating varnishes	high tear resistance, good abrasion characteristics

APPLICATION AREAS

- Electric motor manufacturing
- Wind-power generator
- Transformer manufacturing
- Energy plant engineering
- Machinery and plant engineering

APPLICATION EXAMPLES

- Cable assembly
- Insulation of small-power motors
- Filling materials
- rattle-noise protection
- Thermal protective hoses
- Electric insulating sleeving
- Abrasion protection

Dielectric strength *[kV]*	Insulation class	Standards	Characteristics
no defined dielectric strength	without	Bosch standard 5 997 447...	no swelling on contact with Diesel
no defined dielectric strength	without	Bosch standard 5 997 447...	simple assembly of long cable sets
> 1.50 kV	F	Siemens SN 56727, self-extinguishing analogous to UL 94 V0	used in electric insulation as well as in the automotive sector
> 7.0 kV	F	UL 1441 Recognition, File No. E165094; DIN IEC 60684, (DIN 40620)	very good elasticity, extreme flexibility
> 10.0 kV	F	UL 1441, DIN IEC 60684, (DIN 40620)	double-walled, good elasticity
> 4.0 kV	H	DIN IEC 60684-3-400-402	very good fibre glass impregnation by special immersion process
> 2.50 kV optionally adjustable	H	DIN IEC 60684-3-400-402, UL 1441 VW-1 (UL-Reg.-No. E165094)	extreme elasticity, very good compressibility and abrasion resistance
no defined dielectric strength	without	LV 312 -3 6.5.4.1	thick-walled, max. 3-layer, thermally insulating, crash protective tube
> 10.0 kV	H	DIN IEC 60684, (DIN 40620)	double-walled, horizontally self-extinguishing, good elasticity, silicone-free outer layer
no defined dielectric strength	without	DIN 83307 Form E	Polyester (95%–99%, rest Masterbatch, Avivage)
no defined dielectric strength	without	E-glass to ISO2078	various fillings and impregnations possible
no defined dielectric strength	without	RoHS conformity to 2011/65 EG	Usable for taping of winding heads or as filling material, rattle-noise protection

Ropes, cords, tapes

lessingtiede.de
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Headquarters

BIW INNOVATIONS FOR ENERGY INDUSTRY

BIW is a company founded in 1971 with more than 300 employees and a turnover of more than 55 million Euro. As leading supplier of B2B products from technical textiles and their finishing, BIW keeps a number of tested materials based on E-glass and polyester ready for applications in the energy technology sector. The finishing process substantially includes impregnation using silicone resins, PU or acrylic emulsions and accelerator solutions as well as coatings with silicone rubber or PU or acrylic resin paints. The focus is being placed on **standards UL 1441 and DIN IEC 60684**. Customer requests with respect to colour, hardness and mechanical properties can be implemented by way of in-house mixing development and processing in a broad spectrum. Besides protective and insulation tubes from a combination of technical textiles and their diverse finishings, compact silicone materials and silicone foam with low density as well as silicone mouldings are also part of the BIW production programme. The large production sector offers the option of supplying complete assembly groups. An integrated management system according to **ISO/TS16949, ISO 9001, ISO 13485, ISO 14001, ISO 50001** and **IIP (Investors in People)** is implemented at the location.

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