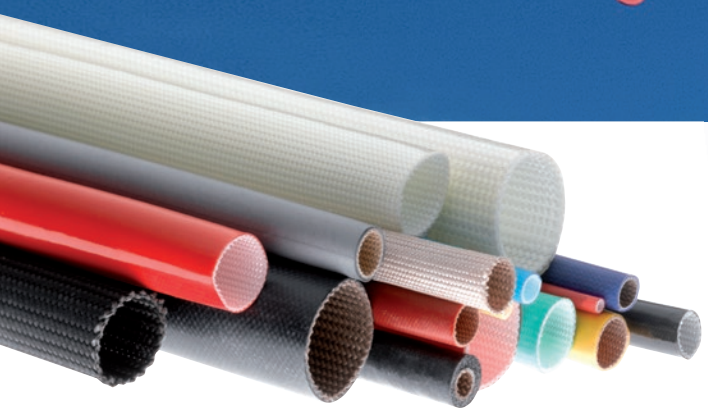
ENERGY TECHNOLOGY

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]*	Temperature meets insulation material class	Chemical resistance
PEATEX	Polyester Acrylic resin	⌀ (inner) 3,0–20 wall thickness 0,4–1,0	-40 to +155 temporarily +200	F	Very good resistance to fuel and lubricants, water, and cleaning agents as well as salt spray mist
ACRYTEX	E-glass Acrylic resin	⌀ (inner) 0,5–30 wall thickness 0,3–1,20	-40 to +155 temporarily +450	F	Very good resistance to fuels and lubricants
VARNITEX	E-glass PU-resin	⌀ (inner) 0,5–35 wall thickness 0,4–1,0	-40 to +155 temporarily +200	F	Excellent impregnating resin compatibility, very good resistance to fuels and lubricants
POLYTEX HE	E-glass Acrylate-PU resin	⌀ (inner) 0,5–30 wall thickness 0,3–1,5	-20 to +155 temporarily +225	F	Good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol
POLYTEX HE DUO	E-glass Acrylate-PU resin	⌀ (inner) 0,5–20 wall thickness 1,0–3,0	-20 to +155 temporarily +225	F	Good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol
ISOTEX LSI	E-glass Liquid silicone	⌀ (inner) 0,5–12 wall thickness 0,4–0,8	-40 to +180 temporarily +280	H	Good resistance to roller bearing grease and cleaning agents of all types (soap, cold cleaner, steam)
ULTRAFLEX	E-glass Silicone	⌀ (inner) 0,5–60 wall thickness 0,6–3,0	-40 to +210 temporarily +300	H	Excellent resistance to water, water-glycol mixtures and salt spray mist, resistant to fuels and lubricants in the event of temporary exposure
THERMOFLEX RI	E-glass Silicone resin	⌀ (inner) 5,0–30 wall thickness 0,6–1,50	-40 to +350 temporarily +450	H	Good resistance to water and salt spray mist as well as fuel and lubricants in the event of brief contact
VARNITEX GENIUS SE	E-glass Silicone acrylic-PU resin	⌀ (inner) 5,0–30 wall thickness 1,0–3,0	-40 to +180 temporarily +225	H	Good resistance to transformer oil as well as various solvents: styrene, xylene, ethanol
POLYESTER CORD	PES also with EP-/acrylic-PU resin	⌀ (outer) 2–10	-20 to +155 temporarily +180	F	Good compatibility with solvent-free impregnating resins
Fibreglass cords	E-glass also impregnated with EP resin or accelerator	⌀ (outer) 4 – 40	-60 to +300 temporarily +500	H	Impregnating varnishes, acids, caustic solutions, resin systems, etc.
Glass fibre tape	E-glass also impregnated with EP resin or accelerator	Width 6–40 thickness 0,08–0,20	-60 to +300 temporarily +500	H	Compatible with all generally available impregnating resins and impregnating varnishes

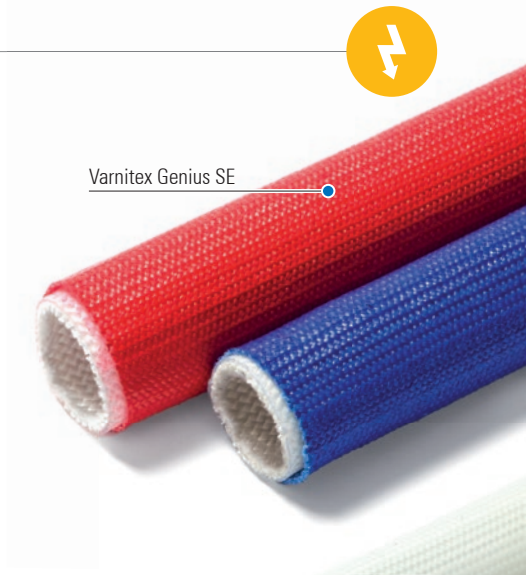
All specifications are based on our experiences. They are typical values which do not constitute specifications. The customer is responsible to test the suitability of the product for the intended use. We are not liable for nor do we warrant the suitability and reserve our right to changes.

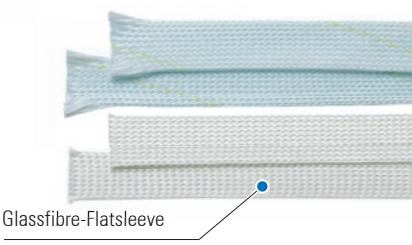
APPLICATION AREAS

- 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





Mechanical properties	Dielectric strength *[kV]*	Standards	Characteristics
Low wear under mechanical and dynamic impacts, very good abrasion resistance	No defined dielectric strength	Bosch-Norm 5 997 447… LV 312-3	No swelling on contact with diesel
Good abrasion resistance, good buckling resistance	No defined dielectric strength	Bosch-Norm 5 997 447...	Simple assembly of long cable harnesses
Good abrasion resistance, buckling and bending resistance	> 1,50 kV	Siemens SN 56727 DIN IEC 60684, (DIN 40620) Self-extinguishing analogue UL 94V0	Use in electrical insulation and automotive sectors
Good tear resistance, high buckling and bending resistance	> 7,0 kV	UL 1441 Approbation File-No. E165094 DIN IEC 60684, (DIN 40620)	Very good elasticity, extreme flexibility, use in electrical insulation, transformers- and electrical motors construction, also used in automotive sectors
Good tear resistance, high buckling and bending resistance	> 10,0 kV	UL 1441 DIN IEC 60684, (DIN 40620)	Two-layered, very good elasticity, extreme flexibility, use in electrical insulation, Electrical motors and transformer construction, also used in automotive sectors
Very good cut- and abrasion resistance	> 3,0 kV	DIN EN 60684 LV 312-3 FMVSS 302 / TL 1010	Very good saturation of the glass fibres
Good abrasion resistance, flexible and stretchy	> 1,50 kV can be set as chosen	DIN EN 60684 LV 312-3 / VW 75151 FMVSS 302 / TL 1010	High flexible sleeve, stretchable in diameter by up to 100%, very good buckling properties and flexibility
Good abrasion resistance, good buckling and bending resistance	No defined dielectric strength	DIN EN 60684 LV 312-3	Crash-protection hose
High abrasion resistance, buckling and bending resistance	> 10,0 kV	DIN IEC 60684, (DIN 40620)	Double-walled, thermally insulated, horizontal self-extinguishing, good elasticity, outer layer with silicone-free coating
High tear resistance, excellent abrasion resistance	No defined dielectric strength	DIN 83307 Form E	Polyester (95% – 99%, rest Master batch, Avivage)
High tear resistance and good abrasion resistance	No defined dielectric strength	E-glass according to ISO 2078	Useable for taping of winding heads or as filling material, rattle-noise protection, various fillings possible
High tear resistance and good abrasion resistance	No defined dielectric strength	E-glass according to ISO 2078 RoHS conformity to 2011/65 EG	Useable for taping of winding heads or as filling material, rattle-noise protection

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Headquarters

BIW INNOVATIONS FOR ENERGY INDUSTRY

BIW is a company founded in 1971 with more than 450 employees and a turnover of more than 64 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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