OCV™ Reinforcements

PRODUCT INFORMATION

ShieldStrand® S

High-Performance Reinforcements

Delivering Performance.
Enabling Possibilities.
Readily Available.

Owens Corning High-Performance ShieldStrand® S roving is part of a new generation of High-Performance Reinforcements from Owens Corning enabling significantly stronger, stiffer and lighter composite parts than traditional E-Glass reinforcements.

Developed for composite hard armor, *ShieldStrand S* can increase protection, payload and performance. *ShieldStrand S* can reduce weight up to 40% when replacing aluminum and up to 50% when replacing steel depending on the application. *ShieldStrand S* provides higher structural performance than aramid, polyethylene and polypropylene and meets fire, smoke and toxicity (FST) requirements for military vehicles. *ShieldStrand S* reinforcements are produced on a large scale using OCV's innovative breakthrough glass fiber technology making it available in large quantities.

ShieldStrand S is pending approval for MIL-DTL-64154B ballistic performance requirements. These results have been validated in the supply chain.

ShieldStrand S glass meets the tensile strength requirements for MIL-R-60346 Type IV Class 1 and 2.

ShieldStrand S glass is made from a boron-free glass formulation that meets S-glass standards, as defined by ASTM C162, DIN 1259, ISO 2078, ASTM D578, and JIS R3410 standards. This glass formulation is designed for excellent mechanical properties (tensile strength and modulus) and offers significantly better thermal and corrosion resistance properties than conventional E-Glass. Because of the critical importance of the synergy between the reinforcements and the matrix, *ShieldStrand S* has a proprietary sizing that makes it ideal for ballistic and blast protection applications using phenolic, polyester, vinyl ester and thermoplastic resin systems.

This document specifies properties for our standard high-performance reinforcement products; however, should you have other special requirements, please contact our dedicated and knowledgeable staff for assistance.

ShieldStrand® S

High-Performance Reinforcements

USAGE AND PERFORMANCE

ShieldStrand S roving consists of continuous filaments gathered in a single-end roving without mechanical twist and treated with specifically developed chemical size or finish. These rovings have a low level of catenary, good processing and handling characteristics such as low fuzz, low static, good run-out and fast wet-out for weaving and knitting, either through creeling or beaming. This results in less downtime and reduced cost for the weaver. *ShieldStrand S* low fuzz and catenary aid prepreg and the resin infusion processes typically used in the ballistic armor plate or spall liner kit manufacturing industry.

TECHNICAL CHARACTERISTICS

LAMINATE PROPERTIES	SHIELDSTRAND® S FIBERS
Impregnated Strand Tensile (ASTM D2343) - 9 mic 360 tex	479 - 589 ksi (3.30 - 4.06 Gpa)
Impregnated Strand Tensile Modulus (ASTM D2343) - 9 mic 360 tex	13.3 MSI (92 Gpa)
PHYSICAL PROPERTIES	
Bulk Density	2.45 gr/cm^3

BENEFITS

Excellent Ballistic Performance

- *ShieldStrand S* glass meets the ballistic performance requirements of Class A/Code 1 MIL-DTL-64154B
- Meets fire, smoke, and toxicity (FST) requirements

Structural Performance

- High strength, high modulus glass fiber - meets the tensile strength requirements for MIL-R-60346 Type IV Class 1 and 2
- Enables higher structural performance than Aramid and HMPE

Affordable

- Up to 60% cost savings vs Aramid

Weight Savings

- Up to 40% weight savings when replacing aluminum
- Up to 50% weight savings when replacing steel

Readily Available

- Large capacity production

PRODUCT OFFERINGS

SHIELDSTRAND® S ROVING	END USE APPLICATION	RESIN COMPATIBILITY	NOMINAL FIBER DIAMETER (µ)	BARE GLASS TEX (g/km)
EPS-S 11	Ballistics	Phenolic, Polyolefin, Polyester, VE	9µ (G fiber)	360 TEX (1378 yd/lb)
EPS-S 11	Structural	Epoxy	9µ (G fiber)	360 TEX (1378 yd/lb)

PRODUCT CHARACTERISTICS AND QUALITY CONTROL LIMITS

PRODUCT CHARACTERISTIC	PRODUCT NOMINAL BARE GLASS	TARGET (TEX WITH SIZING)	MINIMUM TEX	MAXIMUM TEX	METHOD
TEX (g/km)	360 TEX (1377 yd/lb)	362 TEX (1370 yd/lb)	333 (1490 yd/lb)	391 (1269 yd/lb)	ISO 1889
Strand Solids (LOI%)	EPS-S 11	0.67%	0.54%	0.80%	ISO 1887
Moisture (%)	All	N/A	0	0.15%	ISO 3344

PRODUCT LABELING, PACKAGING AND PALLETIZING

ShieldStrand S roving products are supplied on tubeless packages and are designed to be pulled from the inside of the package. If the customer requires outside unwinding, we would gladly provide advice on these options.

Package:

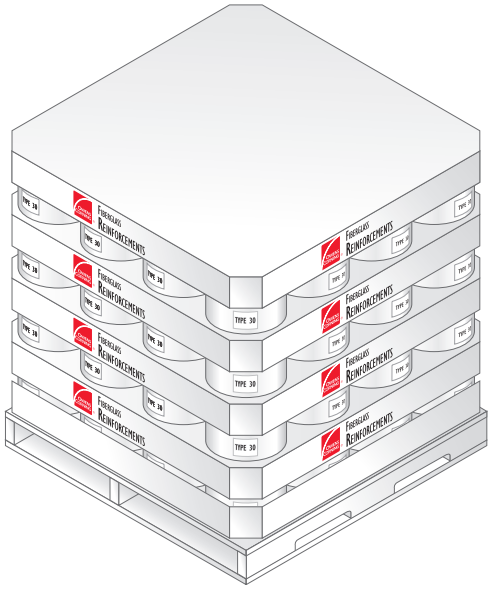
- Cylindrical bobbin without tube, Outside Diameter (OD) ± 270mm, height 260 - 300mm.
- Partial bobbins have smaller diameter.
- Max bobbin weight must not exceed 19kg.
- A maximum of three partial bobbins between 4.5 -11.3kg are permitted on each tier on the pallet.
- Bobbin covered by a Tack-Pack® film.

Pallet:

- Size: 1150 x 1150mm, 4 ways entry.
- 16 bobbins (max OD) per layer, pallets are 4 tiers high
- Pallet is stretch-wrapped.

Identification:

- Bobbin label (each bobbin).
- Five pallet labels, one on side of the pallet and one inserted in the first layer.



VISUAL INSPECTION REQUIREMENTS AND DOCUMENTATION

- A certificate of conformity or analysis may be issued upon request.
- The bobbin shall be firmly and evenly wound with a uniform lay, equal traverse length. The roving shall be wound with even tension and exhibit no catenary. The flanges of the package may present a yellowish aspect which is inherent in the product and is not a cause for reject.
- A package that has (inside the build or on its surface) visible grease, oil, dirt or other foreign matter, 3mm or less in diameter, is rejectable if the total number of defects exceeds two (2). A package is also rejectable if it contains one (1) or more of such defects greater than 3mm in diameter.
- Any package build deformity which interferes with the smooth and uniform runoff of the strand is a cause of rejection of the package.

STORAGE AND USAGE CONDITIONS

- Glass fiber products must remain in the packaging material until just prior to use. It is recommended to bring material in the workshop place at least 24 hours prior to use. Optimal atmospheric processing conditions are: temperature between 20-22°C and relative humidity between 60-65%.
- The packaging system is designed to allow stacking of two pallets. When stacking two high, care should be taken to place the top pallet correctly and smoothly. Owens Corning is not responsible for any damage resulting from stacking pallets higher than two high.

CONTACT INFORMATION

- Please contact your sales representative.

Contact
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