

Glossary

Following are definitions of some uncommon terms used in this Guide:

Advantex® glass: A patented boron-free glass formulation with excellent corrosion resistance in a wide range of environments; it is both an E-CR glass and an E-glass as defined by ASTM D578.

Bare glass: Glass fiber from the bushing before binder or sizing is applied.

Basis weight: Nominal weight of mat for a certain area, ex. 1.5 oz/ft².

Beaming: The operation of winding yarns onto a beam, usually in preparation for slashing, weaving or warp knitting. Also called warping.

Biaxial material: Material having fibers oriented in both the warp (0 degree) and weft (90 degree) direction.

Binder: The agent applied to glass roving, glass mat or preforms to bind the fibers prior to laminating or molding.

Bundle: A general term for a collection of essentially parallel filaments or fibers.

Bundle TEX: A measure of the size of the glass bundles in the mat.

Burst strength: The ability of a material to resist rupture by pressure.

Cem-FIL® reinforcements: Alkali-resistant (AR) glass fiber reinforcements for concrete.

Chop length: The length to which the glass fibers have been cut.

Composite: A combination of two or more materials (reinforcing elements, filler, and resin). The constituents retain their identities though they act in concert.

Count: Determined by the number of warp and weft (fill) yarns per cm/ inch of fabrics. Indicates tightness of weave.

- Creel:** A device for holding the required number of roving balls or mat plies in the desired position before they are fed into the resin bath.
- Crimp:** The amount of extra yarn required to allow for warp and weft (fill) to make a meter (yard) of fabric. Often expressed as a percent.
- Cure:** To irreversibly change the properties of a thermosetting resin by chemical reaction.
- Dry strength:** Strength of the mat as received, an indication of its handling properties prior to addition of resin.
- E-glass:** A family of glasses composed primarily of the oxides of calcium, aluminum and silicon that have chemical compositions as listed in ASTM D578-05 for glasses that are used as reinforcements in general applications.
- Fabric, non-woven:** A textile structure produced by bonding or interlocking fibers by mechanical, chemical or solvent means.
- Fabric, woven:** Material constructed of interlaced yarns, fibers or filaments.
- Fiber:** A general term used to refer to filamentary materials; it is the general term for a filament of finite length.
- Filament:** The smallest unit of fibrous material. Yarn that consists of one strand is called monofilament. Most textile filament yarns are multifilament, meaning there are many continuous filaments or strands.
- Fill:** See Weft.
- Finish:** In composite applications, a finish or sizing promotes adhesion between fiber glass and a matrix resin or coating. Sizing compounds are applied to yarn to bind the fiber together and stiffen the yarn to provide abrasion resistance.
- FliteStrand® reinforcements:** High-performance reinforcements for aerospace applications.

Knitted fabrics: Produced by interlooping strands of yarn, roving, etc.

Laminate: Material composed of successive layers of resin and reinforcement bonded together.

Loss on ignition (LOI): Weight loss, usually expressed as percent of total, after burning off an organic sizing from glass fibers, or an organic resin from a glass fiber laminate.

Mat: A fibrous material for reinforced plastic consisting of randomly oriented chopped filaments, or swirled continuous filaments, loosely held together with a binder; available in various widths, weight, and lengths.

Modulus: The measurement of stiffness in a material, equaling the ratio of applied load (stress) to the resultant deformation of the material. A high modulus indicates a stiff material.

Ply: The number of single yarns twisted together to form a plied yarn, or the number of plied yarns twisted together to form a cord.

Polyester resin: The term generally used for unsaturated polyesters, formed by the reaction of dibasic organic acids and polyhydric alcohol.

Polymer: An organic compound, natural or synthetic, whose structure can be represented by a repeated small unit, such as polyethylene, rubber, polyester and cellulose.

Prepreg: Abbreviation for pre-impregnated reinforcement fibers. Prepreg is any reinforcing material loaded with B-stage resin, catalyst and pigment ready for placement in the mold.

Print Through: Appearance of fiber pattern on part surface.

Profile: A shape, referring to the cross-section of the part to be pultruded.

Pultrusion: A continuous process for manufacturing composites with a constant cross-sectional shape. The process consists of pulling a fiber reinforcing material through a resin impregnation bath and through a shaping die, where the resin is heated and cured.

Reinforced plastics: Plastic parts consisting of resins to which reinforcing fibers, mats, fabrics, etc., have been added before the forming operation.

Reinforcements: Material used in plastic processes to give physical and mechanical properties that plastic alone cannot provide. Typically fiberglass, graphite, aramids and others in roving, mat and/or fabric form.

Resin: A solid or pseudo-solid organic material that exhibits a tendency to flow under stress. Most resins are polymers. In reinforced plastics, the material used to bind together the reinforcement material.

Roving: A number of strands, tows or ends collected into a parallel bundle with little or no twist of reinforcing fibers.

Roving yield: A unit of measure of the linear density of a fiberglass roving in yards/lb., the lower the number the larger the size of the roving bundle.

S-glass: A magnesia-alumina-silicate glass, especially designed to provide very high tensile strength glass filaments.

Scrim: A lightweight, open-weave, coarse fabric.

Selvage or selvedge: The narrow edge of a woven fabric that runs parallel to the warp. It is woven more tightly to prevent the fabric from unraveling.

ShieldStrand® reinforcements: High-performance reinforcements for armor and ballistic protection applications.

Silentex® system: A durable noise control system for automotive and industrial mufflers and silencers.

Sizing: Any treatment consisting of starch, gelatin, oil, wax or other suitable ingredient that is applied to yarn or fibers at the time of formation to protect the surface and aid the process of handling and fabrication. The treatment contains ingredients that provide surface lubricity and binding action, but no coupling agent.

Surfacing mat: A very thin ply, usually 7-20 mils thick, of non-woven glass or synthetic fiber used primarily to produce a smooth, cosmetic surface on a reinforced-plastic laminate.

Tear strength: The resistance of the mat to shearing or tearing.

Tensile strength: The strength exhibited by a fabric subjected to tension, as distinct from torsion, compression or shear.

TEX: Weight in grams per kilometer (1,000 meters) of yarn, fiber, filament or strands.

Thermoplastic: Capable of being repeatedly softened by increase of temperature and hardened by decrease in temperature; applicable to those materials whose change upon heating is substantially physical rather than chemical and that in the softened stage can be shaped by flow into articles by molding or extrusion.

Thermoset: A plastic that, when cured by application of heat or chemical means, changes into a substantially infusible and insoluble material.

Thickness: Fabrics range in thickness and are commonly from .025 mm to 1.27 mm (.001" to .050").

Twintex[®] reinforcement: A co-mingled glass and thermoplastic fiber reinforcement for lightweight, high stiffness, abrasion- and impact-resistant laminates.

Veil: A non-woven glass fiber material used to enhance surface finish, weather-ability, appearance and smoothness to the touch (see surfacing mat).

Warp: The set of yarns that runs lengthwise and parallel to the selvage, and is interwoven with the fill. The sheet of yarns wound together on a beam for the purpose of weaving or warm knitting.

Warping: The operation of winding yarns onto a beam, usually in preparation for slashing, weaving or warp knitting. Also called beaming.

Weave: The system or pattern of intersecting warp and filling yarns. The three most common are plain, twill and satin.

Weft (fill): The transverse threads or fibers in a woven fabric; those fibers running perpendicular to the warp. Each crosswise length is called a pick. In the weaving process, the filling yarn is carried by the shuttle, rapier or some other type of yarn carrier. Weft is also called the fill or filling yarn.

Weight ratio: The ratio of warp to fill.

Wet strength: The apparent strength of mat after addition of resin, an indication of mat performance during impregnation and molding.

WindStrand® reinforcements: High-performance reinforcements for wind blade applications.

Woven fabric: Manufactured on a loom, a fabric consists of a warp and a weft (fill). Together, the warp and weft determine the type of weave.

XStrand® reinforcements: High-performance reinforcements for commercial and industrial applications.

Yarn size: Weight, thickness and coverage of the fabric, thus determining performance characteristics.

Yield: The maximum allowable stress in a material, less than the maximum attainable stress, at which an increase in strain occurs without an increase in stress. Only materials that exhibit this unique phenomenon of yielding have a yield point. Fiberglass-reinforced thermoset plastics generally do not exhibit a yield point. Also a term to describe weight per unit length in yards/lbs., for example a 113 yield product weighs 113 yards/lb.

Useful Acronyms

BMC	Bulk Molding Compound
CFM	Continuous Filament Mat
CIPP	Cured-in-Place Pipe
CSM	Chopped Strand Mat
CS	Chopped Strands
DUCS	Dry-Use Chopped Strands (CS for thermoplastics)
EMEA	Europe, Middle East and Africa
FW	Filament Winding
GRC	Glass-Reinforced Concrete
GRP	Glass-Reinforced Plastics
HLU	Hand Lay-Up
MAX	Multi-Axial fabric
ME roving	Multi-End roving
RTM	Resin Transfer Molding
SE roving	Single-End roving
SMC	Sheet Molding Compound
SU roving	Spray-Up roving
UD	Uni-Directional fabric
WR	Woven Roving