

## Portfolio of Products

Owens Corning offers the widest range of world-class composite reinforcements and other solutions. The company makes those products using global processes that provide consistent quality wherever they are manufactured or used. The following table shows the products available from the OCV™ businesses.

### Reinforcements and Other Solutions

NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
Acoustic and Thermal Insulation	Continuous texturized and untexturized roving, filled bags and inserts (preforms) made with texturized roving that provides noise control and thermal and chemical durability (marketed as Silentex® solutions)	Direct filling of silencers (mufflers) of all types, custom-designed bags and molded preforms for insertion into silencers and texturized roving for filament winding	Automotive, industrial	Transportation, power sport vehicles (motorcycles, snowmobile and ATVs), industrial silencers and other non-automotive applications	N/A
Alkali-Resistant (AR) Glass	Glass fibers manufactured with Zirconia for use with cement-based products (marketed as Cem-Fil® reinforcements)	Glass-reinforced concrete (GRC), mortars, composite cement, stucco and others	Construction	New and restored building facades, pre-cast components, utility poles, and residential and industrial flooring	N/A
Bulky Roving	Lofted assembled roving with a uniformly disoriented but essentially continuous filament structure	Pultrusion	Building materials	Window lineals, structural profiles	UP, EP, VE

NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
Chopped Strand	Fibers of varying diameters chopped into a standard length of 4mm and coated with a chemical sizing for particular resin compatibility; also chopped fibers with fine filament diameters and advanced chemical sizing for engineering resin compatibility	Extrusion, injection molding, sheet molding compound and bulk molding compound	Transportation, recreation, construction, consumer, electrical/electronics and corrosion resistance	Appliances, auto parts, electronics, appliances and plumbing components	UP, PA, PBT, PP, PPO, PPS, PC, PET, PU, PVC, SMA, ABS, SAN, LCP, PA, PEEK
Chopped Strand Mat	Mat comprised of randomly oriented chopped glass fiber strands bonded together into mats, either with an emulsion binder or with a small amount of highly soluble polyester powder	Hand lay-up, compression molding, continuous lamination and vacuum bagging	Marine, transportation, recreation, construction, consumer and corrosion resistance	Auto parts, boats, chemical tanks, surfboards, panels, swimming pools	UP, DCPD, VE, PN, PU
Co-Mingled Glass and Thermoplastic Fibers	Intimately mixed continuous glass and thermoplastic fibers that can be processed directly to make a composite part, or transformed into an intermediate format (fabrics, plates or pellets) for final processing in a second step (marketed as Twintex®)	Vacuum molding, thermo stamping, panel lamination, long-fiber thermoplastics, extrusion and compression, diaphragm forming, injection molding, co-molding, thermoplastic filament winding, thermoplastic pultrusion and pultrusion	Transportation, construction, consumer and recreation, marine and ballistic protection	Automotive structural parts, under-engine protection, door modules, instrument panels and bumper beams; kayaks and small boat hulls; truck panel skins, trailer doors, flooring, skirt and scuff liners; reinforced-PVC profiles; LPG pressure vessels; domestic wind	PP, PET

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PU = Polyurethane PVC = Polyvinyl Chloride SAN = Styrene Acrylonitrile SBR = Styrene Butadiene SMA = Styrenic Maleic Anhydride UP = Unsaturated Polyester VE = Vinyl Ester

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NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
Continuous Filament Mat	Continuous fiber, non-woven mats containing either a soluble or insoluble binder	Compression molding, infusion molding and pultrusion	Electrical apparatus, utility and transportation	Electrical and nonelectrical laminates, ladder rails, rapid-transit third-rail covers and high-voltage transmission line equipment	UP, PU, VE, EP, PN
High-Performance Reinforcements	High-strength continuous glass filaments, gathered and wound, without mechanical twists, into a square-edge cylindrical roving package and trademarked Windstrand <sup>®</sup> , Flitestrand <sup>®</sup> , Shieldstrand <sup>®</sup> and XStrand <sup>®</sup> .	Hand lay-up, filament winding, infusion molding, knitting and weaving, preforming, pultrusion, RTM, vacuum bagging, press molding	Wind energy, aerospace, ballistic armor, industrial sports and recreation	Large wind turbine blades, aircraft flooring, cargo liner, helicopter blades, spall liners, add-on armor, shelters, high pressure tank wraps, high-performance marine vessels, rubber reinforcement, friction applications, cured-in-place pipe rehabilitation	EP, multi-compatibility
Milled Fiber	Glass filaments coated with a sizing to enhance resin compatibility and milled to a specified bulk density; made in two forms (powder and floccular) with powder having the shorter fiber length	Thermoplastic, thermoset and other compounds	Automotive, electrical, consumer, construction, aerospace	Paints, elastomers and putties; gaskets and seals; brakes and clutches; asphalt roofing coatings	UP, VE, EP, PN, PU, PTFE, PC, PA and other thermoplastics
Multi-End Continuous Roving	A collection of continuous glass filaments, gathered and wound, without mechanical twists, into a square-edge cylindrical package	Sheet Molding Compound (SMC), Continuous Molding Compounds (CMC), Glass Mat Thermoplastics (GTM), Long Fiber Injection (LFI)	Automotive, recreational vehicles, business equipment, construction, corrosion resistant, marine, consumer, recreation, transportation	Automotive internal components and exterior body panels with Class A surfaces, recreational vehicle housings, automotive and recreational semistructural applications, business equipment	VE, PU, PP, EP, UP

NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
Single-End Continuous Roving	Single-end continuous roving (trademarked Type 30 <sup>®</sup> ) are individual fibers pulled directly from the bushing and wound onto a roving package ready for shipment	Filament winding, long-fiber thermoplastics, pultrusion, knitting and weaving	Aerospace, military, transportation, electrical	Small diameter oil field pipe, down hole tubing, well casing, chemical processing pipe, electrical rod, grating systems, handrails, large cross-section structural parts, knitted and woven glass fabrics, central stiffness members of fiber optic cabling, filament wound pipe, tubes or tanks	UP, VE, EP, PN, PP, PA, N
Surfacing Veil (Available as Dry-Process C Veils and Wet-Laid E-CR Veils)	Chopped filaments of fiberglass reinforcement bonded together with a proprietary soft binder system designed to conform and be compatible with composite resin systems	Filament winding, compression molding, hand lay-up, panels, pultrusion	Automotive, building products, marine, recreation and transportation	Acoustical ceiling panels, flooring, insulation, gypsum and exterior products, batteries, panels and separator applications, and headliner reinforcement	UP, VE, EP
Wet-Formed Mat	Randomly dispersed chopped glass fibers bonded together with a resinous binder system	Used as a substrate for asphalt-coated products	Building products	Roofing shingles, underlayment and other water proofing systems	Not applicable
Wet-Use Chopped Strands	Coated fiberglass filaments specifically engineered for use in wet-process, non-woven applications	Used in wet-process, non-woven applications	Building products, construction, industrial	Residential and commercial roofing, facers and flooring tiles; specialty papers such as filters, gaskets, printed circuit boards, acoustic tiles, thermal barriers and felt for vinyl-coated flooring	Disperse uniformly and quickly in water-based bonding systems, whether acidic, neutral or basic

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## Fabrics

NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
Biaxial Fabrics	Comprised of continuous fibers in a 0° and 90° direction, held in place by either interweaving a lightweight hot melt yarn to lock the unidirectional fibers in place, or by stitching the fibers in place using yarn	Various processes	Various markets	Boat hulls, truck and trailer panels, wind blades, recreational sporting equipment and bridge decks	Multiple resin systems
BiPly™ Fabrics	Fabrics comprised of woven roving and chopped roving stitch-bonded into one fabric	Various processes	Various markets	Boat hulls, underground storage vessels and other cost-sensitive structural laminates	Multiple resin systems
Double Bias Fabrics	Stitch-bonded, non-crimp reinforcement combining warp (0°), weft (90°) and double bias (±45°) plies into a single multiaxial fabric	Various processes	Various markets	Wind blades, marine panels, snowboards, complex parts	Multiple resin systems
FlowRo® Fabric	Woven roving and continuous filament mat stitch-bonded into a single fabric	Closed molding	Marine, wind, infrastructure, transportation, industrial	Boat hulls and decks, wind turbine blades and nacelles	UP, VE, EP
FlowTex™ Fabrics	Stitch-bonded reinforcement combining equal amounts of continuous fiber oriented in the +45° and -45° directions into a single fabric	Various processes	Various markets		Multiple resin systems

NAME	DESCRIPTION	COMMONLY USED PROCESS	MARKETS	APPLICATION EXAMPLES	RESIN COMPATIBILITY
High-Performance Fabrics	High-performance fabrics offer increased strength, stiffness or temperature resistance compared to traditional glass fabrics; this family of products is produced with strong lightweight materials other than E-glass and are designed for applications where product performance must exceed that of E-glass; the most common materials used for making high-performance fabrics include H-, R- and S-glass, aramid (e.g., Kevlar® and Twaron®) and carbon	Various processes	Various markets	Ballistic armor protection, aerospace and high-performance boats, rotor blades, aircraft wings and high-performance sporting goods	Multiple resin systems
Molding Mat	Non-woven synthetic core stitch-bonded between two layers of binder-free chopped fiberglass; Uniconform® continuous filament mat is needed and does not contain synthetic materials	Various closed molding techniques including resin transfer (RTM), vacuum-assist (VARTM) and press molding	Marine	Boats	UP, VE, EP

Kevlar is a trademark of E. I. du Pont de Nemours and Company  
Twaron is a trademark of Teijin Aramid B.V. Ltd.

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Quadaxial Fabrics	Stitch-bonded, non-cripp reinforcement combining either a warp (0°) or weft (90°) ply with double bias (±45°) plies into a single multiaxial fabric.	Various processes	Various markets	Boat hulls and decks, trailer panels, shipping containers and pultruded profiles	Multiple resin systems
Triaxial Fabrics	Stitch-bonded non-cripp reinforcement comprised of unidirectional warp (0°) and weft (90°) plies	Various processes	Various markets	Wind blades, boat hulls, storage tanks, trailer panels and pultruded profiles such as bridge decks	Multiple resin systems
Unidirectional Fabrics and Tape	Fabrics and tapes comprised of direct roving in a single direction reinforcement with the strength of continuous filaments	Various processes	Various markets	Wind blades, poles, boat stringers, columns, beams, pipe and fittings	Multiple resin systems
Woven Roving	OCV™ Technical Fabrics combines reinforcing materials to achieve special performance benefits; fabrics include woven roving, high performance fabrics, knitted fabrics, specialty products and tape	Virtually all processes from hand lay-up and spray-up to the more complex closed molding processes	Marine, transportation, recreation, construction, consumer and corrosion resistance	Shipping containers, ballistic armor, wind turbine blades and doors	Fabric has mechanical and resin compatibility characteristics tailored to specific end-use applications

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