

Composite Processes

Soon after they found a way to make continuous strands of glass fibers in commercial quantities more than 70 years ago, Owens Corning pioneers started developing the processes for combining that material with resin to make reinforced composites. Basic processes like hand lay-up and spray-up came first, followed later by compression molding and filament winding. Today there is a host of sophisticated processes for combining glass reinforcements with a variety of resins to make literally thousands of products. Owens Corning was intimately involved in the development of many of the processes commonly used today.

PROCESS NAME	DESCRIPTION	TYPICAL MARKETS	PRODUCTS USED
Bulk Molding Compound (BMC)	BMC is a two-step process: the first step is the manufacturing pre-impregnated compound of resin plus glass fibers & the second step is molding the compound by means of compression or injection.	Complex parts such as electrical equipment, car headlamps & housing components for electrical appliances & tools, in large industrial volumes	Chopped strands
Cold Press Molding	A semi-open molding process using lighter duty, reinforced cast composite matched tools mounted into a press. Reinforcements, usually continuous filament mat (CFM), are placed into the tool & a highly filled polyester resin is poured onto them. The press is closed & the part is cured. The process requires lower pressures, 15 - 100 lb/in ² , & temperatures averaging 130°F (55°C). Cycle times are in the range of 10 - 20 minutes. Other glass fiber fabrics, mats, veils & preforms are also used.	Consumer goods, heavy transportation, sports & recreation; parts usually have a fair-to-poor surface, so uses are under-hood auto & truck components like fan shrouds, brackets & battery supports	Continuous Filament Mat (CFM), Chopped Strand Mat (CSM), fabrics, multi-end roving & veil

MARKETS	PROCESSES	PRODUCTS
Consumer Goods	Injection & compression molding, BMC, filament winding, hand lay-up, pultrusion, RIM, RTM & spray-up	Chopped strands, continuous filament mat (CFM), pultrusion & electrical CFM, single-end roving & veil, specialty non-woven mat, Twintex [®] co-mingled glass & thermoplastic fiber, XStrand [®] high-performance reinforcements & fabrics, & Multimat [®] , Multimat [®] Lite, Multicore [®] & Flowtex [®] fabrics
Defense & Security		ShieldStrand [®] high-performance reinforcements & fabrics
Electronics	Continuous lamination, injection molding & RIM	Closed-mold roving, wet-formed mat, pultrusion & electrical CFM, & Multimat [®] , Multimat [®] Lite, Multicore [®] & Flowtex [®] fabrics
Heavy Transportation	Compression molding, continuous lamination, hand lay-up, preforming, pultrusion, RTM & spray-up	Wet-formed mat, chopped strand mat (CSM), chopped strands, closed-mold roving, molding & general purpose CFM, panel roving, single-end roving, Twintex [®] co-mingled glass & thermoplastic fiber, & Multimat [®] , Multimat [®] Lite, Multicore [®] & Flowtex [®] fabrics
Infrastructure	Centrifugal casting, filament winding, pultrusion, spray-up & hand lay-up	CSM, fabrics, non-woven surfacing veils, pultrusion & electrical CFM, single-end roving, TruPave [®] paving mat & woven fabrics
Marine	Cold press molding, hand lay-up, infusion molding, RTM, spray-up & vacuum bagging	CSM, CFM, multi- & single-end roving, surfacing veils, knitted & woven fabrics, Twintex [®] co-mingled glass & thermoplastic fiber, & Multimat [®] , Multimat [®] Lite, Multicore [®] & Flowtex [®] fabrics

MARKETS	PROCESSES	PRODUCTS
Sports & Recreation	Cold press molding, filament winding, infusion molding, preforming, pultrusion, RTM & spray-up	CSM, chopped strands, single-end roving, pultrusion & electrical CFM, surfacing veils, knitted & woven fabrics, Twintex [®] co-mingled glass & thermoplastic fiber, & XStrand [®] high-performance reinforcements, & Multimat [®] , Multimat [®] Lite, Multicore [®] & Flowtex [®] fabrics
Wind Energy	Hand lay-up, vacuum infusion, preforming, pultrusion, RTM, spray-up & vacuum bagging	CFM, knitted & woven fabrics, direct single-end roving, surfacing veils, veil, specialty non-woven mat, Twintex [®] co-mingled glass & thermoplastic fiber & WindStrand [®] high-performance reinforcements