

Technical Information

Channels

Channels are provided in two different resin systems, polyester and vinyl ester resin. These channels are manufactured from a process called pultrusion. Both polyester and vinyl ester channels utilize the same glass rovings and matting with the only difference being the resins. Even though they utilize the same glass rovings and mattings, they exhibit different physical properties. Both resins are flame retardant conforming to ASTM E-84, Class 1 flame spread rating and are self-extinguishing per the requirements of UL94V-0. Both polyester and vinyl ester channels also incorporate UV-resistant surfacing veils. However, since each resin system has its own advantages, it's up to the user to determine which resin system offers the best solution for their application(s).

Materials

Polyester Resin

Polyester resin channels are provided in a dark grey color for CS-S Series channels and a light grey color for CS-SST Series Channels. Polyester channel special colors are available upon request. Polyester resin channels are great general-purpose fiberglass channels that provide very good corrosion resistance in many chemical environments. Polyester resin channels are generally less expensive than vinyl ester channels as well.

Vinyl Ester Resin

Vinyl ester resin channels are provided in beige colors for both the CS-S Series channels and for the CS-SST Series channels. Vinyl ester channel special colors are available upon request. Vinyl ester resin channels are premium-grade fiberglass channels that provide superior corrosion resistance in many chemical environments. Vinyl ester channels are more resistant to impact and less sensitive to temperature and humidity, thus making them more durable and expensive than polyester resin channels.

Polyurethane Resin

Glass-reinforced polyurethane resin is used to manufacture Champion Strut™ pipe clamps, U-bolts, hardware, some channel connector fittings, molded clevis hangers and post bases. These parts are all colored dark grey.

Temperature Ranges

The Champion Strut system utilizes three material types. The following chart illustrates their acceptable operating temperature ranges.

MATERIAL TYPE	LOW TEMPERATURE	HIGH TEMPERATURE
Polyester	-35°F	200°F
Vinyl Ester	-35°F	200°F
Polyurethane	-40°F	140°F

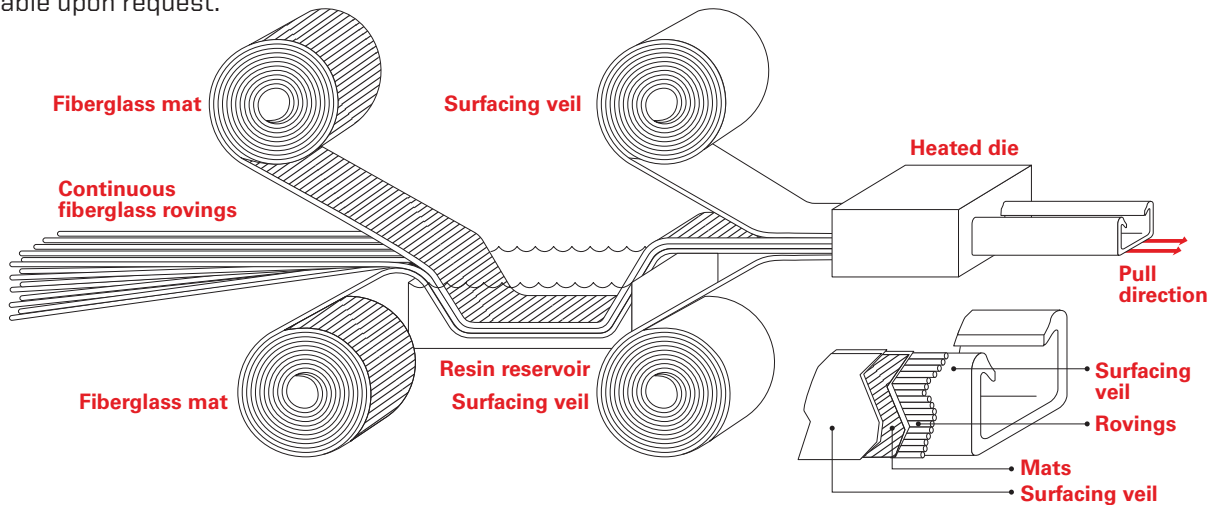
Manufacturing Process

Pultrusion

Pultrusion is a continuous molding process whereby glass reinforcing fibers, glass mattings and UV-resistant surfacing veils are saturated with a liquid polymer (polyester or vinyl ester) resin and then carefully formed and pulled through a heated die to form a part. Pultrusion results in straight, consistent parts of virtually any length. Being that the pultruded component is internally reinforced with permanently bonded continuous glass fibers, it has great strength. In addition to being strong, pultruded components demonstrate excellent corrosion and fire resistance. These features make fiberglass channel an excellent choice for many corrosive industrial applications.

TYPICAL PROPERTIES	TEST METHOD	DIRECTION	UNIT	TYPICAL VALUE POLYESTER	TYPICAL VALUE VINYL ESTER
MECHANICAL					
Ultimate Tensile Strength	ASTM D-638	Longitudinal	PSI	30,000	35,000
	ASTM D-638	Transverse	PSI	7,000	10,000
Tensile Modulus	ASTM D-638	Longitudinal	PSI	2.5 x 10 ⁶	3.0 x 10 ⁶
	ASTM D-638	Transverse	PSI	0.8 x 10 ⁶	1.0 x 10 ⁶
Ultimate Compressive Strength	ASTM D-695	Longitudinal	PSI	30,000	35,000
	ASTM D-695	Transverse	PSI	15,000	20,000
Compressive Modulus	ASTM D-695	Longitudinal	PSI	2.5 x 10 ⁶	2.5 x 10 ⁶
	ASTM D-695	Transverse	PSI	1.0 x 10 ⁶	1.2 x 10 ⁶
Ultimate Flexural Strength	ASTM D-790	Longitudinal	PSI	30,000	35,000
	ASTM D-790	Transverse	PSI	10,000	14,000
Flexural Modulus	ASTM D-790	Longitudinal	PSI	1.6 x 10 ⁶	2.0 x 10 ⁶
	ASTM D-790	Transverse	PSI	0.8 x 10 ⁶	1.0 x 10 ⁶
Shear Strength Short Beam	ASTM D-2344	Longitudinal or	PSI	5,500	7,000
		Transverse	PSI	5,500	6,000
Impact Strength-Izod	ASTM D-256	Longitudinal	ft-lb/in	35	30
		Transverse	ft-lb/in	4	5
Hardness-Barcol	ASTM D-2583	Perpendicular	-	50	50
ELECTRICAL					
Electrical Strength Short Time-in oil	ASTM D-149	Perpendicular	PSI	200	200
		Parallel	PSI	35	35
Dielectric Constant	ASTM D-150	Perpendicular	PSI	5.0	5.0
Dissipation Factor	ASTM D-150	Perpendicular	PSI	0.03	0.03
Arc Resistance	ASTM D-495	Longitudinal or	PSI	80	120
		Transverse	PSI	80	120

The fiberglass channels provided by Champion Strut™ are standardly supplied in 10-ft lengths with 20-ft lengths available upon request.



TYPICAL PROPERTIES	TEST METHOD	DIRECTION	UNIT	TYPICAL VALUE POLYESTER	TYPICAL VALUE VINYL ESTER
OTHER					
Thermal Coefficient of Expansion	ASTM D-696	Longitudinal	in/in/°F	5 x 10 ⁻⁵	5 x 10 ⁻⁵
Thermal Conductivity		Longitudinal	BTU/Hr sq	4.0	4.0
			PSI		
Water Absorption 24 hours	ASTM O-570	Longitudinal	%	1	1
Density	ASTM D-792	Longitudinal	lbs/cu in	0.062	0.062
Color (Standard)				Dark Grey	Beige
Flammability	UL94		Classification:	V-0	V-0
Flammability	ASTM E-84		Rating:	25	25

The above list of properties was derived from laboratory data using coupon test specimens cut from pultruded sections. Such information should only be used as a general guide in design. The factory should be contacted for specific information on any given component.

Weathering

All fiberglass pultruded parts will experience some degradation after prolonged exposure to outdoor weathering. Pultruded fiberglass components have excellent corrosion and temperature resistance but can be attacked by UV. Degradation first becomes apparent when the pultruded component surface loses its shiny appearance and gloss. Over longer periods and in severe cases, the fiberglass closest to the surface will become exposed; however, even in this advanced state, the physical properties of the pultruded part are not compromised by this surface degradation. The Champion Strut fiberglass channel framing system includes dark pigments, UV stabilizers and a surfacing veil to inhibit the effects of weathering and UV degradation. The surfacing veil provides a resin-rich surface which inhibits weathering and acts as a barrier from UV degradation between the surface and the top layer of the fiberglass-reinforced pultruded component. The addition of pigments used within the resin also slow the effects of weathering. The best overall method to protect pultruded components from the effects of outdoor weathering is to apply a protective coating. Champion recommends coating the pultruded components with an outdoor urethane or acrylate paint. This will protect the pultruded components from the future effects of weathering and prolong the fiberglass channel framing system life.

If your application will experience extreme exposure to ultraviolet, please contact Champion Fiberglass to discuss the extreme ultraviolet-resistant fiberglass channel framing system options that are available.

Handling and Storage

Transportation

Fiberglass channels are shipped in self-supporting crates designed to be unloaded by forklift. Crates should not be dropped from the truck trailer flatbeds. Fiberglass channels may also be shipped via enclosed vans in bundles. Smaller lengths of channel (under 5 ft) can be shipped via common courier delivery service.

Storage

- **Fiberglass channel** crates should be stored on a flat, level surface. The wooden frames should line up so the load will be transferred to the wood frames rather than the channel. The height of stacked channel should be limited to 12 ft.
- **Channel accessories**, when stored outdoors, should be under cover to protect items in cartons from the outdoor elements until ready for installation.

Champion Strut™ Specifications

1.0 Scope

- 1.1 This specification covers the requirements for the Champion Strut fiberglass channel framing system

2.0 Materials

- 2.1 Channels shall be pultruded from fire-resistant polyester and vinyl ester resins. Polyester and vinyl ester resins utilized will have a fire-retardant rating of 25 or less when tested in accordance with ASTM E-84 and exhibit low smoke generation. Polyester resin channels provided will be dark grey in color (CS-S Series channels) or light grey in color (CS-SST Series channels). Vinyl ester channels provided will be beige in color (CS-S Series channels and CS-SST Series channels). Special colors are available upon request.
- 2.2 Some channel accessories will be constructed from pultruded polyester and vinyl ester materials. Other channel accessories will be injection molded from long glass fiber-reinforced polyurethane resin.

3.0 Composition

- 3.1 Glass-reinforced channels will be constructed with 70% glass and 30% resin. Channels will utilize UV-stabilized resins (polyester or vinyl ester) and incorporate UV-resistant surfacing veil into the laminate. Surfacing veils will be applied to all exterior surfaces to improve weatherability and inhibit ultraviolet degradation.
- 3.2 Glass-reinforced channel accessories will be injection molded from 40% long glass fiber polyurethane resin. Channel accessories will incorporate dark grey pigments to improve weatherability and inhibit ultraviolet degradation.