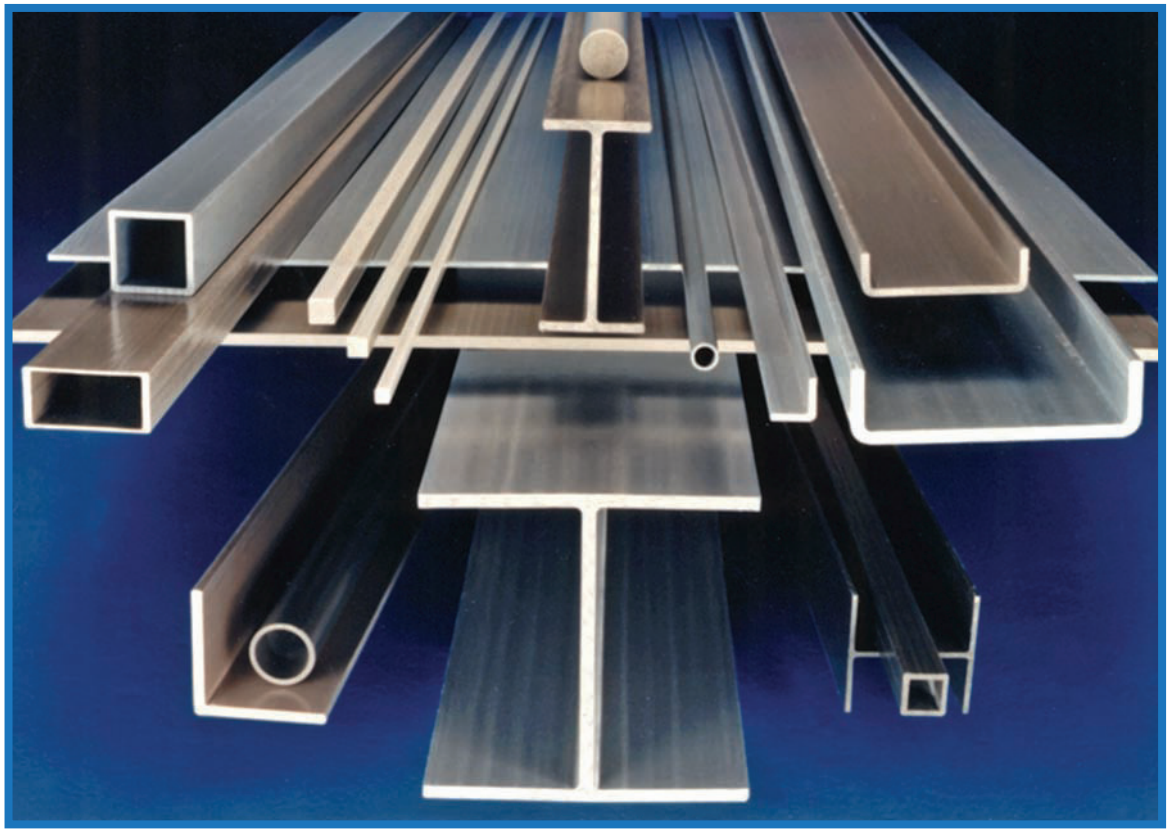
Structural Shapes & Plate

MFG CONSTRUCTION & WATER PRODUCTS



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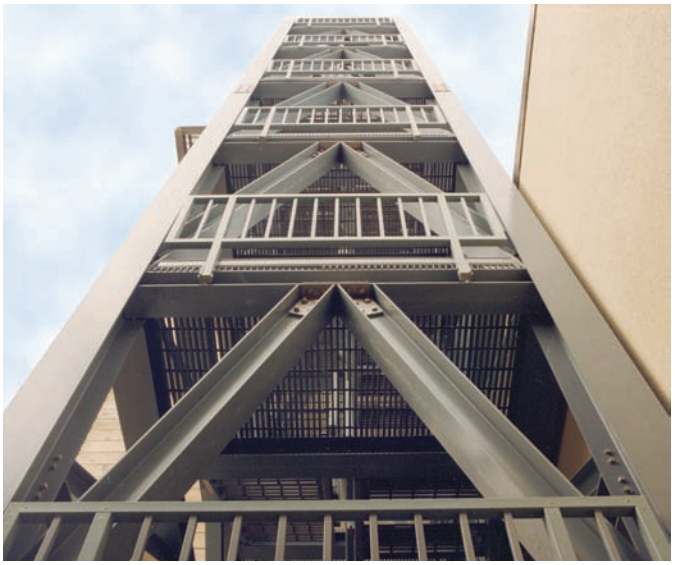
Product Line

EXTREN® is a proprietary combination of fiberglass reinforcements and thermosetting polyester of vinyl ester resin Systems. It is produced in more than 100 standard shapes. All EXTREN® shapes have a surface veil to protect against glass fibers penetrating the resin surface in service and to increase corrosion and UV resistance.
EXTREN® is offered in three series designed for environments and applications:

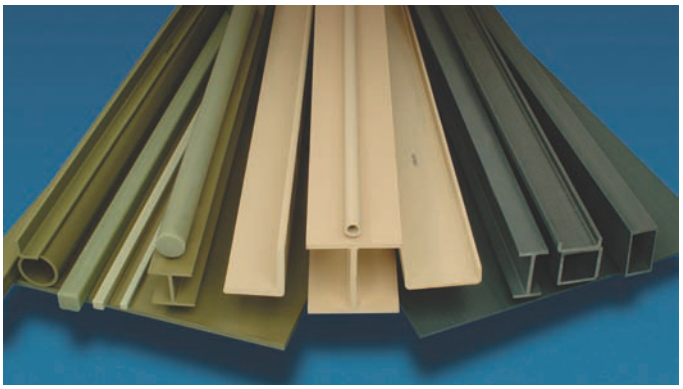
EXTREN® 500 An all purpose series utilizing an isophthalic resin system with a UV inhibitor. The resin system can be formulated to meet NSF requirement.
Color Olive Green

EXTREN® 525 An all-purpose series utilizing a fire retardant isophthalic polyester resin system with a UV inhibitor.
Color Slate gray (plus certain handrail and fixed-adder components in yellow)

EXTREN® 625 A premium series – both fire retardant and highly corrosion resistant – utilizing a vinyl system with a UV inhibitor.
Color beige



A 63' (19.2m) high freestanding fiberglass stair tower at Fort Story Army Base, Virginia Beach, Virginia.



The three EXTREN® series (left to right) 500, 625, 525

EXTREN® structural shapes were used in a SXEW copper refinery because of the highly corrosive environment.

EXTREN® does not rot or corrode; making it the ideal material for cooling tower construction.

Markets:

- Aeronautical Defense
- Air Pollution Control
- Agricultural
- Appliance/Equipment
- Building Construction
- Cellular Communications
- Chemical Processing
- Consumer/Recreation
- Electrical/Electrical Utility
- Food and Beverage
- Oil and Gas
- Plating
- Pulp and Water
- Transportation
- Water/Wastewater

EXTREN® fiberglass plate and structural shapes were used for cellular shielding and were made to match the style and appearance of the appearance of the Santa Ana Historical building.

EXTREN® structural shapes were used to fabricate pipe supports to hold 1,000 lineal feet (304.8m) of 54'' (1371.6mm) diameter pipe.

Lightweight, corrosion resistant 24" (610mm) I- beams span 45' (13.7m) to bridge clarifiers at the Las Rusias, Texas Wastewater Treatment Plant.

Properties

	ASTM TEST METHOD	UNITS/ VALUE	SERIES 500/525 SHAPES	SERIES 625 SHAPES	SERIES 500/525 PLATE ⑤ 1/8" 3.175mm	SERIES 500/525 PLATE ⑤ 3/16" - 1/4" 4.76-6.35mm	SERIES 500/525 PLATE ⑤ 3/8" - 1" 9.5-25.4mm	SERIES 625 PLATE ⑤ 1/8" 3.175mm	SERIES 625 PLATE ⑤ 3/16" - 1/4" 4.76-6.35mm	SERIES 625 PLATE ⑤ 3/8" - 1" 9.5-25.4mm
MECHANICAL										
Tensile Stress, LW	D638	psi N/mm²	30,000 207	30,000 207	20,000 138	20,000 138	20,000 138	20,000 138	20,000 138	20,000 138
Tensile Stress, CW	D638	psi N/mm²	7,000 48.3	7,000 48.3	7,500 51.7	10,000 68.9	10,000 68.9	7,500 51.7	10,000 68.9	10,000 68.9
Tensile Modulus, LW	D638	10^6 psi 10^3N/mm²	2.5 17.2	2.6 17.9	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4
Tensile Modulus, CW	D638	10^6 psi 10^3N/mm²	0.8 5.52	0.8 5.52	0.7 4.83	0.9 6.21	1.0 9.65	1.0 6.89	1.0 6.89	1.0 9.65
Compressive Stress, LW	D695	psi N/mm²	30,000 207	30,000 207	24,000 165	24,000 165	24,000 165	24,000 165	24,000 165	 165
Compressive Stress, CW	D695	psi N/mm²	15,000 103	16,000 110	15,500 107	16,500 114	20,000 138	16,500 114	17,500 121	 121
Compressive Modulus, LW	D695	10^6 psi 10^3N/mm²	2.5 17.2	2.6 17.9	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4	1.8 12.4
Compressive Modulus, CW	D695	10^6 psi 10^3N/mm²	0.8 5.52	0.8 5.52	0.7 4.83	0.9 6.21	1.0 9.65	1.0 6.89	1.0 6.89	1.0 9.65
Flexural Stress, LW	D790	psi N/mm²	30,000 207	30,000 207	35,000 241	35,000 241	30,000 207	35,000 241	35,000 241	30,000 207
Flexural Stress, CW	D790	psi N/mm²	10,000 68.9	10,000 68.9	13,000 89.6	15,000 103	18,000 124	13,000 89.6	15,000 103	18,000 124
Flexural Modulus, LW	D790	10^6 psi 10^3N/mm²	1.6 11.0	1.6 11.0	1.8 12.4	2 13.8	2 13.8	1.8 12.4	2 13.8	2 13.8
Flexural Modulus, CW	D790	10^6 psi 10^3N/mm²	0.8 5.52	0.8 5.52	0.9 6.21	1.1 7.58	1.4 9.65	1.0 6.89	1.1 7.58	1.4 9.65
Modulus of Elasticity ①	full section	10^6 psi 10^3N/mm²	2.6 17.9	2.8 19.3						
Modulus of Elasticity: W & I shapes > 4" W & I shapes > 102mm	full section	10^6 psi 10^3N/mm²	2.5 17.2	2.5 17.2						
Parallel Compressive Shear Stress, LW ②⑨	D3846	psi N/mm²	3,000 20.7	3,000 20.7						
Shear Modulus, LW ③⑨	—	10^6 psi 10^3N/mm²	0.425 2.93	0.425 2.93						
Short Beam Shear, LW ⑧⑨	D2344	psi N/mm²	4,500 31.0	4,500 31.0						
Bearing Stress, LW	D953	psi N/mm²	30,000 207	30,000 207	32,000 220.6	32,000 221	32,000 221	32,000 221	32,000 221	32,000 221
Poisson's Ratio, LW ⑨	D3039	in/in mm/mm	0.33 0.33 .330	0.31 .330	0.31 .310	0.31 .310	0.32 .310	0.32 .320	0.32 .320	 .320
Notched Izod Impact, LW	D256	ft-lbs/in J/mm	25 1.33	15 1.33	10 .801	10 .533	15 .533	10 .801	10 .533	 .533
Notched Izod Impact, CW	D256	ft-lbs/in J/mm	4 .214	4 .214	5 .267	5 .267	5 .267	5 .267	5 .267	5 .267
PHYSICAL										
Barcol Hardness	D2583	—	45 ④	45 ④	40	40	40	40	40	40
24 hr Water Absorption ⑦	D570	% Max	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Density	D792	lbs/in³ 10^{-3}g/mm³	.062-.070 1.72-1.94	.062-.070 1.72-1.94	.060-.068 1.66-1.88	.060-.068 1.66-1.88	.060-.068 1.66-1.88	.060-.068 1.66-1.88	.060-.068 1.66-1.88	.060-.068 1.66-1.88
Coefficient of Thermal Expansion, LW ⑨	D696	10^{-6} in/in/°F 10^{-6} mm/mm/°C	4.4 8.0	4.4 8.0	4.4 8.0	4.4 8.0	4.4 8.0	4.4 8.0	4.4 8.0	4.4 8.0
Thermal Conductivity ⑨	C177	BTU-in/ft²Hr/°F w(m*°K)	4 .58	4 .58						

All values are minimum ultimate properties from coupon tests except as noted.

① This value is determined from full section simple beam bending of EXTREN® structural shapes.

② The shear stress test results will change radically if the notched orientation is altered. The value in this chart represents the test configuration where the notches are machined parallel to the reinforcing mat. For notches machined perpendicular to the reinforcing mat, this value would be two to three times larger.

③ The Shear Modulus value has been determined from tests with full sections of EXTREN® structural shapes.

④ Value would be 50 if the surfacing veil were not there.

⑤ Plate compressive stress/modulus measured edgewise and flexural stress/modulus measured flatwise.

⑥ Values apply to Series 525 and 625.

⑦ Measured as a percentage maximum by weight.

⑧ Span to depth ratio of 3:1; EXTREN® angles will have a minimum value of 4000 psi and the I/W shapes are tested in the web.

⑨ Typical values because these are shape and composite dependent tests.

LW — Lengthwise
CW — Crosswise
PF — Perpendicular to laminate face
N.T. — Not Tested

PROPERTIES	ASTM TEST METHOD	UNITS/ VALUE	SERIES 500/525 SHAPES	SERIES 625 SHAPES	SERIES 500/525 PLATE ⑤ 1/8" 3.175mm	3/16" - 1/4" 4.76-6.35mm	3/8" - 1" 9.5-25.4mm	SERIES 625 PLATE ⑤ 1/8" 3.175mm	3/16" - 1/4" 4.76-6.35mm	3/8" - 1" 9.5-25.4mm
ELECTRICAL										
Arc Resistance, LW ⑨	D495	seconds	120	120						
Dielectric Strength, LW ⑨	D149	KV/in KV/mm	35 1.38	35 1.38	35 1.38	35 1.38	35 1.38	35 1.38	35 1.38	35 1.38
Dielectric Strength, PF ⑨	D149	volts/mil	200	200	200	N.T	N.T	250	N.T	N.T
FLAMMABILITY ⑥										
Flammability Classification (1/16")	UL 94	V0								
Tunnel Test	E-84	25 Max								
NBS Smoke Chamber	E-662	650-700 (Typical)								
Flammability	D635	Self Extinguishing								
UL Thermal Index	Generic	130°C								
British Fire Test	BS 476-7	Class 1								

Options

MFG offers a broad range of fiberglass industrial products; two other products often used with EX-TREN® are SAFPLATE® and FIBREBOLT®. A brief description of each is given here. Full-color literature is available for each product upon request.

SAFPLATE ®

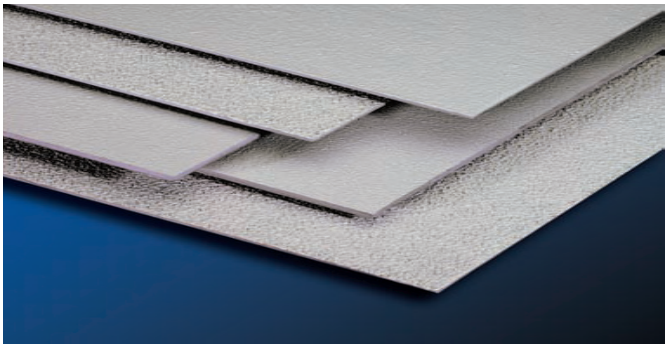
SAFPLATE® fiberglass gritted plate is a tough, corrosion resistant floor plate. The unique combination of pultruded fiberglass plate and an anti skid surface makes SAFPLATE® a textured solid sheet flooring that is ideal for both wet and dry applications. Used in a variety of applications such as trench covers to contain vapors and fumes or pedestrian bridge walkways for sure footing. SAFPLATE® provides a long-lasting , maintenance-free alternative to steel plate for severe and corrosive environments.

SAFPLATE® is available as solid plate or bonded to DURADEK® OR DURAGRID® grating. The grit surfaces can be fine, medium or course. It is available in 4' × 8' (1.2 × 2.4m) panels in all standard EXTREN®plate thickness: 1/8 " (3.2mm), 3/16 (4.8mm), ¼" (6.4mm), 3/8" (9.5mm), ½" (12.7mm)and ¾" (13.9). The standard SAFPLATE® is fiberglass reinforced polyester with fire retardant in a gray color. Other resin systems and custom colors are available upon request.

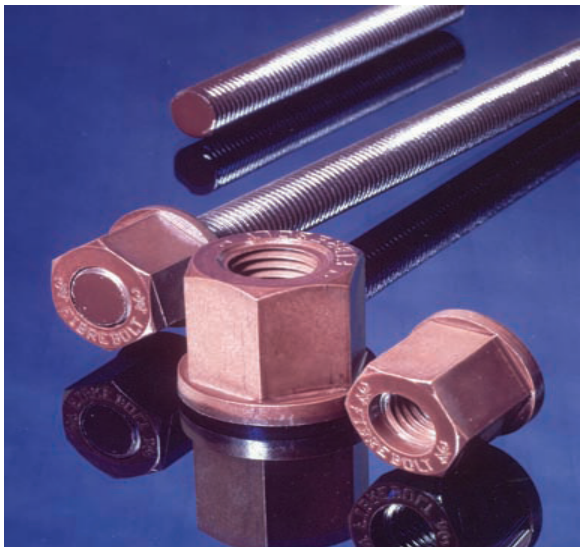
FIBREBOLT ®

FIBREBOLT ® fiberglass studs and nuts are ideal for applications requiring mechanical fasteners that must be noncorrosive, low in conductivity and/or transparent to electromagnetic waves. FIBREBOLT studs are machined from pultruded fiberglass vinyl ester rods. The hex shaped nut is thermoplastic. They are easily assembled with a standard six point socket wrench.

FIBREBOLT® studs and hex nuts are available in diameters of 3/8" (89.5mm) ½" (12.7mm), 5/8" (15.9mm), 3/4" (19.1mm) and 1" (25.4mm) for immediate delivery. Four foot bolt lengths are standard, with custom lengths and partial length threading available on request. Brown is the standard color. The studs and nuts have UV inhibitors to provide resistance to ultraviolent degradation and corrosion.



SAFPLATE®, a solid anti-skid flooring, helps reduce worker slips and falls in both wet and dry applications.



FIBREBOLT® is widely used as a replacement for metallic fasteners in structures that must be low in conductivity and/or transparent to electromagnetic waves.