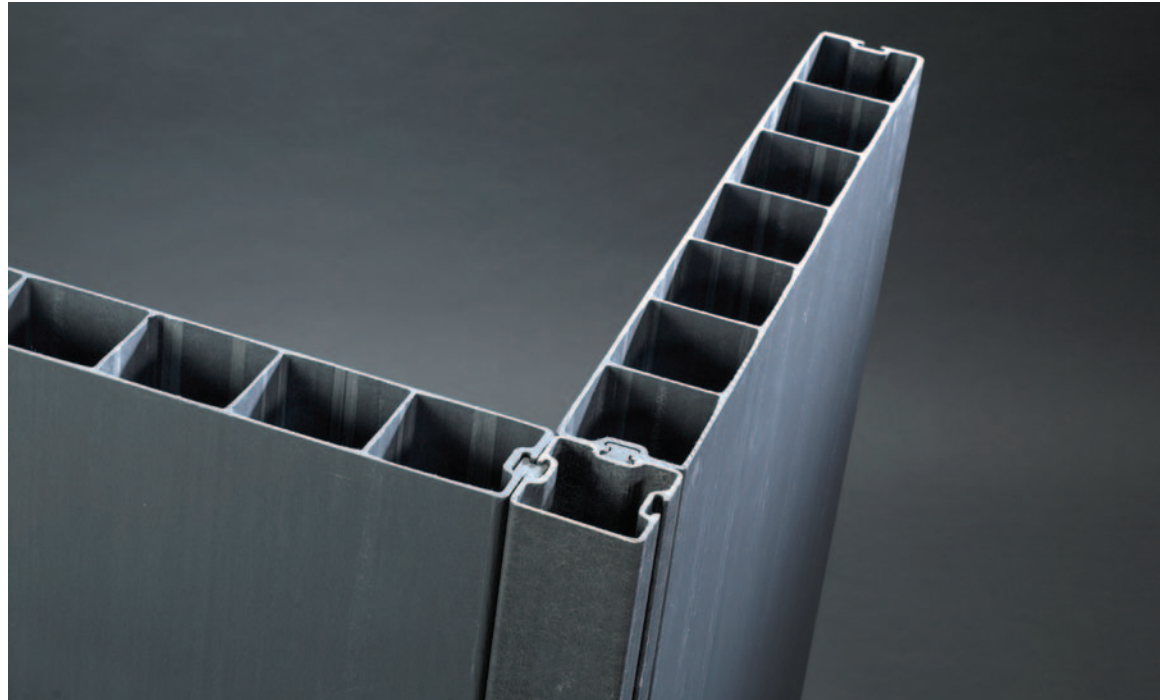GEF Incorporated

COMPOSOLITE®

FIBERGLASS BUILDING PANEL SYSTEM

Advanced Building Panel System

The Wilcott pedestrian bridge, in Shropshire, England, was constructed from COMPOSOLITE® panels, 3-way connectors and toggles. The bridge, which is 163' long and more than 7' wide, was built in three units and spliced to fabricate the total length.

This wash housing is constructed of COMPOSOLITE® 3-way connectors, toggles and panels. No internal structure is required. Dimensions are 36' x 16' x 14'-3/4" high. Low maintenance, ease of construction and an attractive appearance were the benefits to the customer.

A visitor center in Bristol, UK, is constructed of COMPOSOLITE® panels, 3-way connectors and toggles with no supporting frame. Cells of panels and 3-way connectors were filled with foam for thermal insulation.

COMPOSOLITE® is an advanced composite building panel system suitable for major load bearing structural applications. The modular construction system consists of a small number of interlocking fiber reinforced polymer (FRP) structural components produced by the pultrusion process. The main building panel is an open ribbed, 3" thick x 24" wide nominal size. Panels can be connected using the 3-way connectors, 45° connectors, toggles and/or hangers.

This uniquely designed system of interlocking components makes it possible to design fiberglass structures at significantly lower costs for a broad range of construction applications. COMPOSOLITE® structures can be designed in "kit form" and shipped flat to the job site.

Typical applications include:

- Buildings
- Bridge Decks
- Platforms & Walkways
- Bridge Enclosure Systems
- Tank Covers
- Cellular Enclosures

System Design

COMPOSOLITE® combines manufacturing simplicity with an almost unlimited number of configurations.

The panels feature integrally molded longitudinal grooves into which a connector or toggle is inserted during assembly. 3-way and 45° connectors allow the system components to turn corners and facilitate the joining of walls or sides. Toggles lock panels and connectors together securely. For added flexibility, the system also includes a hanger and an end cap.

For permanent structures, joints between panels and connectors are bonded during assembly. After the adhesive is applied along the length of the panel and connector, the toggle mechanically secures the components and creates even pressure along the length of the joint until the adhesive cures.
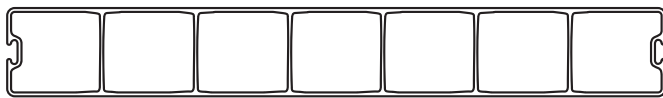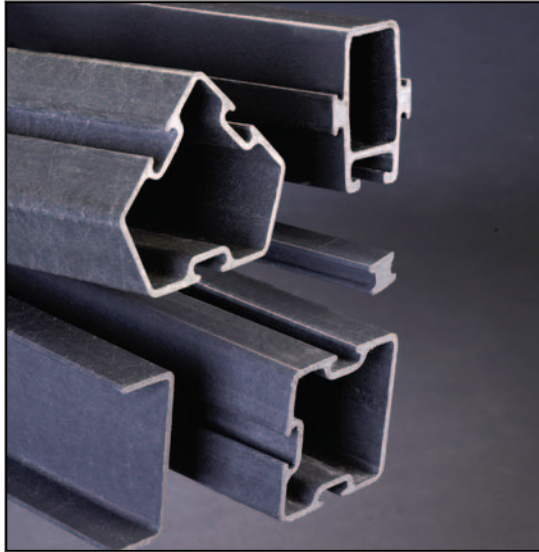
Materials of Construction

COMPOSOLITE® is a system of five interlocking components manufactured of pultruded fiberglass reinforced polymer. This construction makes COMPOSOLITE® particularly well-suited to outdoor use and/or corrosive environments.

COMPOSOLITE® is available in polyester, vinyl ester, NSF 61 certified or polyester fire retardant resin systems. It is stocked in the polyester fire retardant resin system in a slate gray color. The standard fire retardant resins meet the requirements of Class 1 rating of 25 or less per ASTM E-84 and the self-extinguishing requirements of ASTM D-635. The resin is UV inhibited and the composite includes a surface veil on all exposed surfaces for enhanced corrosion and UV protection.

Other resins and colors are available upon request.

System Components

Mechanical Properties *(minimum)*

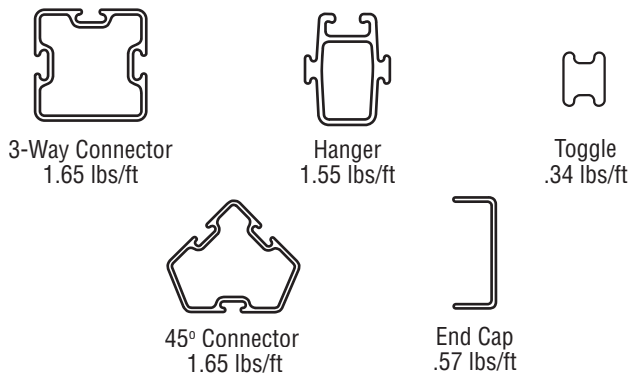| Properties	ASTM Test Method	Value
Flexural Strength, LW	D790	24.5 ksi
Flexural Strength, CW	D790	8.2 ksi
Flexural Modulus , LW	D790	885 ksi
Flexural Modulus, CW	D790	646 ksi
Tensile Strength	D638	31.1 ksi
Tensile Modulus	D638	2,486 ksi
Short Beam Shear	D2344	3.19 ksi

Allowable Uniform Load Table (psf)

SPAN (ft.)	@Δ=span/60			@Δ=span/120			@Δ=span/180		
	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing
4	.8	*778	*774	.4	*778	*774	.27	*778	*774
5	1.0	*624	*620	.5	*624	*620	.33	490	486
6	1.2	*520	*516	.6	449	445	.40	299	295
7	1.4	*466	*462	.7	303	299	.47	204	200
8	1.6	*390	*386	.8	214	210	.53	142	138
9	1.8	311	308	.9	156	152	.60	104	100
10	2.0	233	229	1.0	116	112	.67	78	74
11	2.2	176	172	1.1	88	84	.73	59	55
12	2.4	140	136	1.2	70	64	.80	47	43
13	2.6	110	106	1.3	56	52	.87	37	33
14	2.8	90	86	1.4	48	44	.93	30	26
15	3.0	74	70	1.5	37	33	1.00	25	21
16	3.2	61	57	1.6	30	26	1.09	21	17
17	3.4	51	47	1.7	25	21	1.13	17	13
18	3.6	43	39	1.8	22	18	1.20	14	10
19	3.8	36	32	1.9	18	14	1.27	12	8
20	4.0	32	28	2.0	15	11	1.33	11	7

*Controlled by strength with a factor of safety of 2.50 for flexural and 3.0 for shear. Note: All values are typical.

Panel
(3" x 24" nominal size — 80mm x 604.7mm actual)   7.49 lbs/ft

3-Way Connector
1.65 lbs/ft

Hanger
1.55 lbs/ft

Toggle
.34 lbs/ft

45° Connector
1.65 lbs/ft

End Cap
.57 lbs/ft

Section Properties
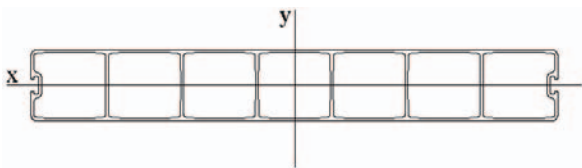
I_x = 15.9 in.⁴

S_x = 10.2 in.³

r_x = 1.33 in.

I_y = 422 in.⁴

S_y = 105 in.³

r_y = 6.88 in.

A = 8.89 in.²

Aw_x = 2.78 in.²

Aw_y = 6.11 in.²

I_{xx} = 2.73 in.⁴

I_{yy} = 2.69 in.⁴

S_{xx} = 1.80 in.³

S_{yy} = 1.71 in.³

A = 2.01 in.²

r_x = 1.17 in.

r_y = 1.17 in.

Load Table
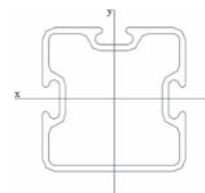
Span (ft.)		300	600	900	1000	1250	1500	1750	2000	2250	2500	2750	3000	E$_a$I ① (10⁶ lbs./in.²)	Maximum② Load/Deflection (lbs.)
6	C	300	600	900	1000	1250	1500	1750	2000	2250	2500	2750	3000	--	3000
	ΔC	.06"	.11"	.17"	.19"	.23"	.28"	.32"	.37"	.42"	.46"	.51"	.55"	42.7	.55"
	U	50	100	150	167	208	250	292	333	375	417	458	500	--	500
	ΔU	.03"	.07"	.10"	.11"	.14"	.17"	.20"	.23"	.26"	.28"	.31"	.34"	42.7	.34"
7	C	300	600	900	1000	1250	1500	1750	2000	2250	2500			--	2571
	ΔC	.08"	.15"	.23"	.26"	.32"	.38"	.45"	.51"	.58"	.64"			48.2	.66"
	U	43	86	128	143	178	214	250	285	321	357			--	367
	ΔU	.05"	.10"	.14"	.16"	.20"	.24"	.28"	.32"	.36"	.40"			48.2	.41"
8	C	300	600	900	1000	1250	1500	1750	2000	2250				--	2250
	ΔC	.15"	.23"	.34"	.38"	.48"	.58"	.67"	.77"	.86"				48.6	.86"
	U	38	75	112	125	156	188	219	250	281				--	281
	ΔU	.07"	.14"	.21"	.24"	.30"	.36"	.41"	.47"	.53"				48.6	.53"
9	C	300	600	900	1000	1250	1500	1750	2000					--	2000
	ΔC	.16"	.32"	.47"	.53"	66"	.79"	.92"	1.050"					50.2	1.05"
	U	33	67	100	111	139	167	194	222					--	222
	ΔU	.10"	.20"	.29"	.33"	.41"	.49"	.57"	.65"					50.2	.65"
10	C	300	600	900	1000	1250	1500	1750						--	1800
	ΔC	.21"	.42"	.63"	.70"	.87"	1.05"	1.22"						51.8	1.25"
	U	30	60	90	100	125	150	175						--	180
	ΔU	.13"	.26"	.39"	.44"	.54"	.65"	.76"						51.8	.78"
11	C	300	600	900	1000	1250	1500	1750						--	1785
	ΔC	.27"	.55"	.82"	.92"	1.14"	1.4"	1.6"						52.4	1.63"
	U	27	55	82	91	114	136	159						--	160
	ΔU	.13"	.27"	.40"	.54"	.55"	.66"	.77"						52.4	.78"
12	C	300	600	900	1000	1250	1500							--	1500
	ΔC	.35"	.70"	1.05"	1.17"	1.46"	1.75"							53.5	1.75"
	U	25	50	75	83	104	125							--	125
	ΔU	.22"	.44"	.65"	.72"	.91"	1.09"							53.5	1.09"
13	C	300	600	900	1000	1250								--	1385
	ΔC	.44"	.88"	1.31"	1.46"	1.82"								54.4	2.02"
	U	23	46	69	77	96								--	105
	ΔU	.28"	.57"	.85"	.95"	1.18"								54.4	1.29"
14	C	300	600	900	1000	1250								--	1285
	ΔC	.54"	1.08"	1.63"	1.81"	2.26"								54.7	2.32"
	U	21	43	64	71	89								--	920
	ΔU	.34"	.68"	1.02"	1.13"	1.41"								54.7	1.43"
15	C	300	600	900	1000									--	1200
	ΔC	.66"	1.33"	1.99"	2.21"									55.1	2.65
	U	20	40	60	67									--	80
	ΔU	.41"	.82"	1.24"	1.38"									55.1	1.65"
16	C	300	600	900	1000									--	1125
	ΔC	.80"	1.60"	2.39"	2.66"									55.4	3.00"
	U	19	37	56	62									--	70
	ΔU	.51"	1.00"	1.5"	1.66"									55.4	1.87"
17	C	300	600	900	1000									--	1055
	ΔC	.96"	1.91"	2.87"	3.19"									55.5	3.36"
	U	18	35	53	59									--	62
	ΔU	.61"	1.19"	1.8"	2.0"									55.5	2.10"
18	C	300	600	900	100									--	1000
	ΔC	1.13"	2.27"	3.40"	3.78"									55.6	3.78"
	U	17	33	50	56									--	56
	ΔU	.70"	1.41"	2.11"	2.36"									55.6	2.36"
19	C	300	600	900										--	947
	ΔC	1.3"	2.7"	4"										56.0	4.21"
	U	16	32	47										--	50
	ΔU	.84"	1.69"	2.48"										56.0	2.64"
20	C	300	600	900										--	900
	ΔC	1.54"	3.07"	4.60"										56.4	4.6"
	U	15	30	45										--	45
	ΔU	.96"	1.91"	2.87"										56.4	2.87"

① – E$_a$I is the typical apparent stiffness based on deflection testing; the load tables developed based on this stiffness are typical values.

② – The maximum load is determined by using a maximum moment of 216,000 in./lbs.; no distortion was observed in the panel.

U = Uniform load (lbs.) spread across the full panel width.

C = Concentrated load (strip load) across the full panel width.

GEF

gef GEF INCORPORATED

6497 WINFIELD ROAD • WINFIELD, WEST VIRGINIA 25213
304/755-1600 • 304/755-3150 FAX • 800/784-0529 TOLL FREE

NOTE: COMPOSOLITE® is a trademark of Maunsell Structural Plastics, Ltd. and used by Strongwell Corporation pursuant to license.

INT10M0603
©Strongwell